

NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

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► USER SURVEYS

ICA reports on key trends

BY JOHN GALLANT
Network World Staff

DALLAS — The International Communications Association (ICA) released two reports last week that illustrate dramatic shifts in telecommunications spending and in management compensation and reporting structures.

The ICA's "Telecommunications Expense Survey" shows that users in the airline industry significantly outpaced their counterparts in other industry segments in telecommunications spending for 1987. The report shows that air carriers expect to spend over 25% more on telecommunications this year than they did in 1986.

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► CARRIER COMPETITION

Intra-LATA toll war brewing

BOCs prepare to protect hold on local market.

BY PAM POWERS
Senior Editor

The Bell operating companies are bracing to defend their lucrative intra-LATA toll business in response to recent moves by state regulatory agencies to deregulate those markets, opening the floodgates to competition from AT&T and other long-distance carriers.

At least three BOCs have surveyed customers to de-

termine how many use long-distance carriers to make calls within local access and transport areas and how calling habits would change if long-haul carriers offered more competitive intra-LATA toll rates.

"Intra-LATA toll is a very large and profitable business for us and one which we intend to vigorously hold on to," said Bailey Geeslin, vice-president of marketing and technol-

ogy with Nynex Services Co.

The intra-LATA toll market totals \$5 billion to \$7 billion annually, said Sanford Fain, director of public policy and government relations for Allnet Communications Corp., a long-

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NETWORK LINE

News

► Communications managers find financial savvy an important asset when planning network strategies. Page 2.

► Hewlett-Packard pulls the wraps off its 10M bit/sec Ethernet-over-twisted pair net. Page 2.

► The seven RBHCs work to complete common channel signaling nets, laying the groundwork for end-to-end ISDN services. Page 2.

► Banyan answers user concerns by adding new security features to an en-

hanced version of its VINES network operating system, expected to be announced at PC Expo this week. Page 4.

► Start-up Teletix awards Hewlett-Packard a \$90 million contract to install and maintain its ATM-like airline ticket distribution network. Page 4.

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► As modem speeds increase, so does the need for a standardized error-control protocol. In an exclusive *Network World* debate, the leading proponents of the two major candidates for such a protocol, MNP and LAP D, champion their causes. Page 28.

NEWSPAPER

► VALUE-ADDED NETWORKS

FCC proposal unites users

VAN providers mobilize clients against access charge plan.

BY BOB WALLACE
Senior Editor

Spurred by value-added network giants Tymnet/McDonnell Douglas Network Systems Co. and Telenet Communications Co., users are rallying in opposition to a Federal Communications Commission proposal to levy local access line fees on VAN operators.

More than 100 users attended recent meetings jointly sponsored by rivals Tymnet and Telenet ("Tymnet, Telenet join to fight FCC," NW, Aug. 10).

At the meetings, held in San Francisco and Tysons Corner, Va., top officials and regulatory experts of the two companies demonstrated to their customers how the FCC's proposed access charge could change communications costs. Tymnet and Telenet urged users to oppose the FCC action.

Now, many of those users are working to outline for their top management the ramifications of the FCC plan

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OPEN SYSTEMS: HOW OPEN ARE THEY?

Networking tempts Apple

BY BYRON BELITSOS
Special to Network World

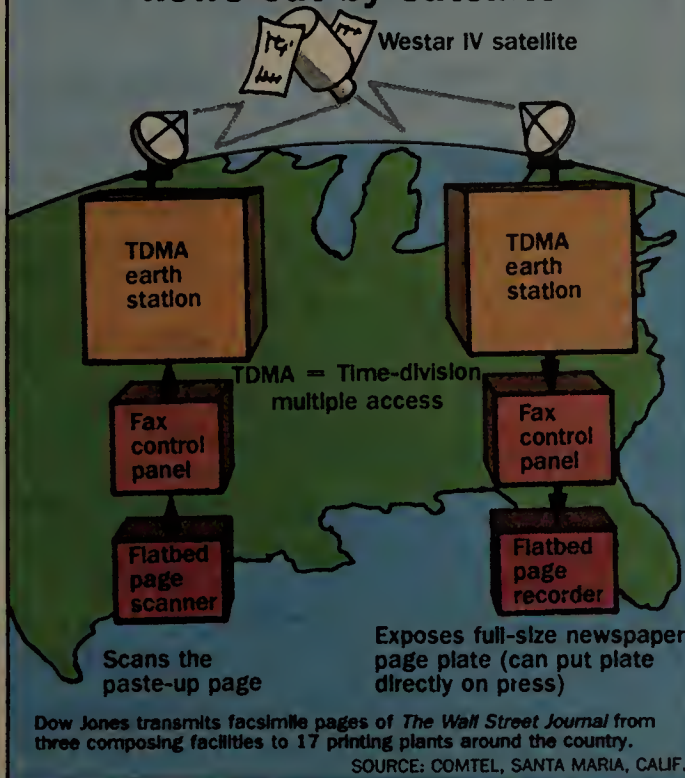
Unlike vendors of larger systems, microcomputer vendor Apple Computer, Inc. started out in a market oriented toward stand-alone machines and is playing catch-up in the connectivity game.

Apple hasn't had an easy time convincing the business community that the closed Macintosh is a thing of the past and that Apple is now fully committed to international standards and interoperability.

The recent announcement of IBM and Digital Equipment Corp. connectivity

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Dow Jones & Co., Inc. gets the news out by satellite



► NETWORK INNOVATIONS

Dow Jones upgrades satellite net

BY JOSH GONZE
Staff Writer

SOUTH BRUNSWICK, N.J. — With its satellite network operating at full capacity and data traffic threatening to back up, Dow Jones & Company, Inc. is implementing an innovative technique that should quadruple the capacity of its existing net.

The company will spend \$680,000 to upgrade the network for the new technology, which combines time-division and frequency-division satellite access techniques, staving off the

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► **MANAGEMENT**

Finance skills a must for managers

BY MICHAEL FAHEY

Senior Writer

Whether they like it or not, communications managers are finding it increasingly necessary to understand concepts such as depreciation and discounted cash flow, tools borrowed from the world of finance.

The growing cost and complexity of networks requires a basic understanding of these and other financial concepts to sell projects to upper management and to help identify strategic applications for network technology.

"If you don't have a knowledge of finance, you will not know

where many of the decision points are," said William Luyties, senior consultant at Comsol Ltd. in San Francisco. "Every major purchase is financed, either internally or externally. You don't have to be an accountant, but you have to know that depreciation can play a role in purchasing decisions."

Depreciation is one of the finance tools communications managers have to understand because it applies to big-ticket items such as private branch exchanges and T-1 multiplexers.

Typically, telecommunications equipment is depreciated over a five-year span for tax purposes. This five-year depreciation period,

which is shorter than the actual useful life of the equipment, is found in the Modified Accelerated Cost Recovery System, which is part of the federal tax laws.

Depreciation has a positive effect on a company's balance sheet because it can be subtracted from income to lessen the tax bite. Accelerating the depreciation schedule allows the company to recover its tax allowance more quickly.

Businesses, however, are allowed to keep two sets of books when it comes to depreciation. In addition to depreciating equipment for tax purposes, they can depreciate the equipment over a longer period of time based on its estimated

useful life to determine the value of their assets.

One method of determining annual depreciation, called the straight line method, is calculated by dividing the purchase price of the equipment — minus its salvage value — by the number of years of its useful life. "This is important for the shareholders who want to know how well the company is doing," Luyties said.

The pace of technological change can influence the useful life of telecommunications equipment, according to Luyties. For example, a company may want to depreciate a T-1 multiplexer at a faster rate than a PBX because T-1 technology is changing so rapidly, thereby shortening the useful life of that gear.

"There are a number of methods
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► **HEWLETT-PACKARD**

HP launches 10M bit/sec Ethernet on twisted pair

BY PAULA MUSICH

Senior Editor

PALO ALTO, Calif. — Hewlett-Packard Co. is scheduled to unveil this week a 10M bit/sec Ethernet-type nonshielded twisted-pair wire network, joining SynOptics Communications, Inc. and 3Com Corp. in the race to provide users with high-speed networks based on telephone-type wiring.

HP's new network, dubbed the HP Starlan 10, will provide direct connections for HP's personal computers, which run MS-DOS, and for IBM Personal Computers and compatibles. It will support all existing Ethernet network adapter cards.

The network is compatible with MS-DOS 3.0 and higher and Microsoft Corp.'s MS-Net networking software. It also runs HP's OfficeShare networking software. In addition, HP is expected to announce soon support for IBM's Network

Basic I/O System.

HP, which already offers an existing 1M bit/sec Starlan network, added the faster version for connecting more powerful workstations, such as 80386-based machines and large network work groups.

Users on both HP's 1M bit/sec Starlan 1 and the 10M bit/sec HP Starlan 10 can communicate via a coaxial Ethernet backbone.

Both HP Starlan versions use the same wiring structure and can run the same software. HP also said that it will provide Starlan 1 users with an upgrade path to Starlan 10.

Personal computers outfitted with Ethernet boards are connected to an HP Starlan 10 Pod that provides a two twisted-pair cable link to a telephone wall jack.

Workstation links are wired to a 12-port hub, usually located in a wiring closet, at distances up to

325 ft. Network hubs can be linked to form a 144-node network. The hubs can also be used to interface to an IEEE 802.3 Ethernet-type coaxial cable backbone, providing access to larger HP processors.

The network's maximum distance from workstation to hub is similar to the SynOptics Lattisnet telephone wire Ethernet product. Prior to the work of these two firms, supporting 10M bit/sec over telephone-type wire at such distances was thought impossible. HP claimed that it leveraged its expertise in microwave technology and test and instrumentation equipment to overcome the problems of radiation and cross talk.

"Radiation exists in the form of electromagnetic waves that radiate out of the cable. This radiation increases exponentially as the frequency of the data signals increases," explained Bernard Guidon, group marketing manager for HP's Information Networks Group. "If your network radiates a lot, you're also susceptible to interference, which creates noise, or cross talk, that can wipe out signals," he continued.

Rather than using a traditional
See page 47

► **RBHCS**

Firms prep signaling networks

BY JOSH GONZE

Staff Writer

The seven regional Bell holding companies are readying common channel signaling (CCS) networks that, by 1989, will support alternate billing, advanced calling services and 800 data base services.

The services made possible by the new signaling networks will provide new sources of revenue, pave the way for the RBHCs' entrance to toll-free carrier business and lay the groundwork for end-to-end Integrated Services Digital Networks.

With CCS, information necessary to establish circuits through the switched network is carried on a network separate from the traffic-bearing network.

The out-of-band signaling method, which also transports data regarding the origin, destination and billing party for calls, among other things, is replacing the traditional in-band signaling practice, in which call set-up data simply precedes calls through the network.

The CCS networks the RBHCs are now building will support the CCITT Signaling System 7 (SS7) protocol, one of the standards at the heart of ISDN. Besides paving the way for ISDN, establishment of CCS networks will enable the RBHCs to support virtual private
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New research on high-temperature superconductivity may someday have an impact on communications technology. **Page 5.**

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TELECOM TRENDS

AT&T's Network Management Center monitors and controls Wisconsin's statewide Electronic

Tandem Network. **Page 9.**

DATA DELIVERY / NET MANAGEMENT

Both Exxon and Mobil are issuing credit cards that double as debit cards, designed to boost usage of gas station POS terminals. **Page 15.**

LOCAL NETWORKING

The Air Force Systems Command is testing a large network-based office system designed to streamline administrative functions. **Page 17.**

COMMUNICATIONS MANAGER

Communications professionals are looking to specialized software packages to meet the challenge of managing today's increasingly complex networks. **Page 19.**

NEW PRODUCTS AND SERVICES

Digilog's new channel access unit can be used to splice testing equipment into T-1 transmission facilities between multiplexers and line-termination equipment. **Page 23.**

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Network World wants to make its news coverage even better, and for that we ask your help. If you know of an interesting event that just occurred or is about to occur, please call. We'd also like to know how you optimize your networks. Call Editor Bruce Hoard toll free at (800) 343-6474.

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► PC EXPO

Banyan to debut VINES security enhancements

BY JOSH GONZE

Staff Writer

NEW YORK — In a move aimed at addressing users' security concerns, Banyan Systems, Inc. is expected to announce at PC Expo here this week an enhanced version of its Virtual Networking System (VINES) network operating system that contains new security features.

VINES Version 3.0 includes a new network security program called VANGuard, designed to give network administrators tighter control over network access and to aid in maintaining access records. VANGuard enables administrators to create audit trails, encrypt passwords, limit dial-up access to a local network and restrict log-on according to such parameters as location, time and date.

The password-encryption feature automatically changes the way a password is encoded over time to prevent hackers from accessing the net by using recordings of passwords made with diagnostic listening devices.

The audit trails are logs detailing network activity as well as the times and places of access. Telephone dial-in restrictions allow only specified users to enter a network via modems.

Analysts say security is an important concern of information systems executives. Since mainframe-based networks are generally more secure than local networks of personal computers, MIS directors often shy away from linking local nets into larger, corporate networks.

"Most mainframe systems provide better security than LANs do today," said Bob Clark, vice-president and general manager of vendor consulting at Santa Clara, Calif.-based Infonetics, Inc. "We

learned that LAN security is not foolproof enough for most MIS directors. These people were concerned about connecting LANs to their main systems because they had no way of restricting access."

David Penzias, product marketing manager at Banyan, agreed that local networks are commonly faulted for their security risks. He also said he believes vendors are working to reduce security weaknesses.

Clark said security programs such as VANGuard address a complaint often expressed in the MIS community. "This kind of change addresses the issues that MIS directors have been pushing at ven-

dors for a couple of years now," he said.

Clark said cost accounting, which Novell, Inc. addressed in a recent operating system upgrade, is also a high priority for many users.

But Penzias disagreed that demand exists for such capabilities on local networks. "Our primary goal right now is to provide security," he said. "Our customers might like cost accounting, but it's not really a major requirement at this time." Banyan will provide a VINES cost-accounting component if sufficient demand arises.

VINES includes programs for file, disk and printer sharing, a user-naming service called Street-Talk and, in Version 3.0, the VANGuard security features.

Penzias said VINES users with support contracts will receive Version 3.0 automatically, while others will pay an as yet undetermined price. □

► TOLL FRAUD

US Sprint files suit

Seeks \$20m from alleged code thieves.

BY PAM POWERS

Senior Editor

KANSAS CITY, Mo. — US Sprint Communications Co. filed federal lawsuits in three states late last week, seeking in excess of \$20 million in damages from an alleged multistate code-abuse theft ring.

In a series of raids occurring in Kansas, California, Texas and Washington, U.S. Secret Service agents and private investigators for US Sprint seized hundreds of illegally obtained access codes through which "at least \$20 million of fraudulent calls were made that we can identify," said US Sprint spokesman Mike Furtney.

The codes allegedly were obtained by the defendants, Frederick M. Deneffe III, Burton Leroy Andrews, Kenneth J. Sheridan and Karlheinz Mueller, through com-

puters that were programmed to dial a series of numbers to uncover US Sprint long-distance codes. Furtney said US Sprint customers owned most of the codes.

The theft ring allegedly sold the unauthorized codes through advertisements to businesses that were offered deals such as unlimited long-distance dialing for \$150 a month, Furtney said.

"It stretches your imagination to believe that these businesses thought the deals were legitimate when their method of payment to the theft ring involved sending unmarked money orders to post office boxes in the middle of nowhere," he commented.

US Sprint has suffered the heavy cost of code abuse, which, in its first quarter alone, cost the company \$19 million. It has

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► CONTRACT AWARD

Firm plans bold airline ticket net

BY JOSH GONZE

Staff Writer

SAN FRANCISCO — Start-up Teletix, Inc. handed Hewlett-Packard Co. a contract valued at up to \$90 million last week for the assembly and support of as many as 10,500 ATM-like terminals to be used in a huge airline-ticket distribution network.

Teletix plans to install ticketing terminals in corporate offices, hotel lobbies and convention centers around the U.S. It will also sell ticket distribution services to travel agents that primarily serve business travelers. The Teletix network is designed to help travel agents pull corporate travel contracts away from their rivals.

Teletix Vice-President Arch Meredith said use of the network could, in effect, create branch offices nationwide for small agencies. It could also enable large agencies with many offices to reduce overhead by closing some of their branches.

The advantage to travelers, the network's end users, will be fast ticket delivery and reservation changes while on the road, according to Mike Hogan, Teletix director of national sales. "Business travelers change their reservations all the time. This way, they get the new ticket and boarding pass within 10 minutes," he said.

Steven Trooboff, president of Trooboff and Co., Inc., a travel agency management consulting

firm, questioned that strategy, saying, "My experience says that anything a travel agency can buy that will give them a competitive advantage, their competitor can buy and neutralize the advantage."

Teletix agency customers would make reservations through their current system, typically either American Airlines, Inc.'s Sabre network or United Airlines, Inc.'s Apollo network. Teletix will tap the mainframes at the heart of these reservation networks and transmit the ticket data to the appropriate remote terminal.

Teletix will charge travel agencies transaction fees for the distribution service.

The ticket terminals themselves, See page 42

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► SUPERCONDUCTIVITY

Network advances forecast

BY MARY LINEHAN
Staff Writer

As the temperature at which superconductivity can be achieved continues its erratic climb up the Kelvin scale, researchers are warily eyeing possible applications of the technology in communications.

In the future, low-cost superconductors could enable users to transmit information over vast distances without repeaters and could support much wider network bandwidths.

But many observers believe the frenzy surrounding superconductivity is outpacing development of the technology and is obscuring current advancements in other important communications technologies, such as fiber optics.

"The general feeling around here is that if we don't get beyond the temperatures we are at these days, the impact [of superconductivity on communications] will be minimal," said a spokesman for AT&T Bell Laboratories. He noted that recent evidence of the possibility of superconductivity at room temperature is "ambiguous, at best."

Discovered 75 years ago, superconductors are materials that conduct electricity without resistance. The materials currently used must be cooled to extremely low temperatures, as low as absolute zero — minus 460 degrees Fahrenheit — to become superconductive. To date, the cost of supercooling has limited superconductivity to such applications as high-resolution medical imaging and experimental nuclear fusion.

But researchers are making progress in achieving superconductivity at higher temperatures and, thus, lower cost.

In the spring of 1986, two IBM physicists achieved superconductivity in a new ceramic compound at 30 degrees Kelvin, or minus 439 degrees Fahrenheit — breaking previous records for high-temperature superconducting.

By March 1987, groups in China, Japan and at the University of Houston independently discovered a second ceramic material that increased the temperature to 90 degrees Kelvin, or minus 284 degrees Fahrenheit. The ultimate goal of scientists is to achieve superconductivity at or near room temperature.

According to a researcher at IBM, new superconductors being tested at company laboratories hold the potential for supporting wider bandwidths. Alex Malozemoff, research division coordinator for high-temperature superconduc-

tivity, said experiments have shown that some low-temperature superconductors transmit at very high frequencies.

"The high frequencies are related to the energy gap of the superconductor. The new high-temperature

superconductors are supposed to have an even larger gap, which would support higher frequencies and, therefore, wider bandwidth," Malozemoff said.

He said users may one day combine superconductors and fiber optics to meet their communications needs. "Fiber optics are extremely effective, but conversion of information to light is always a factor," he

said. "If information is going to be sent a short distance, it might be advantageous to send the signal by a superconductor."

Gilbert Chin, director of materials research at AT&T Bell Laboratories, described the potential for repeaterless power and signal transmission. He said superconductors could eliminate signal degradation. See page 42

What's the Score in T3 Fiber-Optic Channel Extension?

		Data Switch	Other
1	Does the vendor offer channel extension over public T3 networks at distances of over 25 miles?	Yes	
2	Can the vendor provide reference accounts for support of data streaming devices, such as high-speed cartridge tape drives, at 3 megabytes/second?	Yes	
3	Does the vendor offer a complete line of channel extension products for extending low-, medium-, and high-speed devices?	Yes	
4	Can the vendor offer a local or extended channel-to-channel adapter (CTCA) at a reasonable price?	Yes	
5	Is the vendor's equipment transparent to your operating system and applications software?	Yes	
6	Does the vendor's equipment include redundant power supplies for maximum reliability?	Yes	
7	Is the vendor able to provide an integrated computer switching and channel extension system?	Yes	
8	Can the vendor support various transmission options, such as single-mode and multi-mode fiber over long and short distances, and T3 links?	Yes	
9	Does the vendor have its own nationwide service organization?	Yes	
10	Are the vendor's channel extenders complemented by a complete line of Data Path Management products, including computer matrix switching, data communications matrix switching, and performance measurement systems?	Yes	

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Washington Update

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — **The U.S. General Services Administration** last week extended the bidding deadline for the \$4.5 billion Federal Telecommunications System (FTS) 2000 contract from Aug. 31 to Sept. 30, the third such delay since the project was announced more than a year ago.

The delay is perceived by observers as an attempt to give GSA officials and congressional critics time to resolve their differences over the way FTS 2000 procurement is being handled.

Sen. John Glenn (D-Ohio), Senate Government Affairs Committee chairman, last week released a U.S. General Accounting Office (GAO) report that criticized the GSA's plan to award the FTS contract to a single vendor and cited the GSA for failing to consider other alternatives. The GAO is an arm of Congress. The report said the GSA "should continue with its planned FTS 2000 procurement," provided it clarifies the government's right to acquire services from other vendors after the minimum four-year contract period expires.

The report stated there are "some short-term advantages to

allowing the FTS 2000 bidding to continue, at least as an interim solution, while a long-term strategy is worked out."

The GSA said that it plans, during the next two years, to develop a long-term strategy to meet the government's telecommunications needs after 1992.

The GAO criticized the GSA for failing to develop a unified strategy for dealing with the myriad of telecommunications procurement projects recently undertaken by the agency.

Those GSA projects include FTS 2000, Washington Interagency Telecommunications System procurement and Aggregated Switch Procurement Programs.

Another GSA critic, Rep. Jack Brooks (D-Texas), House Government Affairs Committee chairman, wants the GSA to award the FTS contract to two teams of vendors as a means of ensuring greater competition. Last month, Brooks outlined a plan to split the contract revenue on a 70%-30% basis between two bidders.

Both AT&T and Martin Marietta Corp., the two prime contractors bidding on FTS 2000, say they still plan to submit bids, despite the new delay.

■ **The Federal Communications**

Commission recently approved AT&T's Digital Tandem Switching Service (DTSS) tariff, which will allow the company to commence implementation of a \$400 million private network for General Electric Co.

Approval of the tariff also allows AT&T to design similar customized private networks, using existing tariffed services such as Megacom and Software-Defined Network, for other corporate customers ("AT&T's special GE net tariff on hold," NW, June 8).

The FCC said it will continue to investigate the lawfulness of AT&T's DTSS rates and ordered AT&T to keep a separate accounting of DTSS costs to demonstrate the service is not being cross-subsidized with other rate-based revenues. It denied requests by AT&T's critics that the DTSS tariff be rejected. US Sprint Communications Co., MCI Communications Corp., Network Equipment Technologies, Inc. (NET), Pacific Bell and Nevada Bell all challenged the AT&T tariff. Sprint and NET said AT&T should not be allowed to bundle regulated services under a single tariff for one customer. Sprint said DTSS rates were artificially low and did not reflect AT&T's costs. □

► EDI SERVICES

GEISCO will sell ASC ware

BY BOB WALLACE

Senior Editor

ROCKVILLE, Md. — General Electric Information Services Co. (GEISCO), one of the nation's largest Electronic Data Interchange (EDI) network service providers, last week signed a marketing and support pact with ACS Network Systems to sell ACS' EDI software to users in a variety of industries.

Both parties said they are hoping to entice members of the Retail EDI Users Group, which is due to assemble next month at the National Retail Manufacturers Association (NRMA) in Chicago, to use GEISCO's value-added network for EDI traffic.

Garment makers and retail apparel store chains have banded together to define and adopt a subset of ANSI's X.12 EDI standard to be used in their industry ("Garment firms to adopt EDI code," NW, Aug. 17).

When used in conjunction with GEISCO's third-party network, the ACS software, designed to run on the IBM System/36 and System/38, would enable a product manufacturer to pass X.12-formatted docu-

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Firms prep signaling networks

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network (VPN) services. Virtual networks are provided over switched-network facilities but provide corporate users with private network-like functionality, such as extension dialing.

Officials at Nynex Corp. and BellSouth Corp. told *Network World* their operating companies will offer VPN services, and four of the other five said they are also considering such services. "We intend to deploy private virtual networks beginning in the late '88 or early '89 time frame," said Bruce Johnson, staff manager for planning and implementation at Nynex Services Co., the Nynex subsidiary responsible for technical planning.

Others indicated they are studying VPN mainly for its possible use in Federal Telecommunications System 2000, a \$4.5 billion federal government network contract the RBHCs are bidding for in conjunction with both Martin Marietta Corp. and AT&T.

But the first application the RBHCs expect to implement using CCS will be data bases supporting 800 services. Such 800 data base services are disallowed under the Modified Final Judgment, but the Department of Justice recently lobbied U.S. District Court Judge Harold Greene to lift the restriction.

The data bases will contain account information such as the customer's preferred 800 service long-

distance carrier for different regions and different times of day. When an 800 call is placed, the signaling network will tap the data base of the destination RBHC through the signaling net, requesting carrier-routing instructions.

RBHC-provided 800 data base services would enable customers to use different long-distance carriers with the same 800 number and provide customers with least-cost routing by carrier, based on geography, time of day and other parameters.

"One flexibility the 800 data base will have is that, looking at the full seven digits and knowing it's an 800 number, we can route the call to a specific carrier," said Frank Cheston, district staff manager for access planning at Bell Atlantic Network Services, Inc.

Under the current system, specific 800 numbers are assigned to each carrier, and the RBHCs simply read the number dialed and hand the call off to the assigned carrier.

Barring continuation of the regulatory restraint, the RBHCs expect to offer 800 data base services in the fourth quarter of 1988. One notable exception is BellSouth Corp., which plans to storm the trenches of 800 service in the first quarter of next year, according to Ronnie Thweatt, staff manager at BellSouth Services, Inc.

In the first quarter of 1989, after introduction of 800 data bases, all the RBHCs plan to offer a set of alternate billing services. Also based on newly deployed data bases, the services will typically include credit card calling, third-party billing and collect calls. Today, these types of calls are normally operator-assisted and often passed to AT&T, regardless of the user's regular long-distance company, officials at Ameritech said. The Equal Access injunction requires the RBHCs to pass these calls to the caller's preferred carrier.

Officials at all the RBHCs agreed that CCS is a linchpin for full deployment of ISDN services. ISDN requires that call-signaling data be transmitted out-of-band, in accordance with the specifications of SS7. "Without SS7, ISDN can't be a reality, unless it's segmented islands of ISDN. SS7 is a very integral part of the ISDN network," said Arnie Moore, area manager at Southwestern Bell Telephone Co.

Brian Breedlove, Ameritech services director of network architecture, agreed, "In a full deployment of ISDN, SS7 is essential." Breedlove said CCS and SS7 will be used to interconnect stand-alone ISDN nodes in a long-haul network.

CCS makes these advanced services possible through special data bases maintained on the signaling network called service control points (SCP). The SCPs contain the routing tables and account-verification information needed for ad-

vanced calling services.

A typical call will trigger a message over the signaling network to a high-speed packet switch called a service transfer point. That switch determines whether the call requires service from a data base. If the call is simple enough to be completed without consulting any routing or carrier data held in an SCP, the switch will pass the signaling message to another central office or interexchange carrier.

If the call is a data base-type call, such as an 800 number call, the service transfer point consults its local data base for instructions. The switch then acts to complete the signaling connection based on the information. If the signaling network determines that the number dialed is valid and on-hook, the actual voice connection is made.

Some services supported by the basic signaling system do not require a data base and only involve the additional data that the network will carry. So-called customer local-area signaling (CLASS) services involve providing called parties with information about the caller, such as the number of the telephone from which the caller dialed. CLASS services include automatic redial for repeatedly calling the same number, automatic recall for returning calls and call trace for identifying callers. Most of the RBHCs are studying CLASS services, and BellSouth and Pacific Telesis Group plan to offer them by 1989. □

INDUSTRY UPDATE

Acquisition and merger plans proceed

Digital Communications Associates, Inc. last week completed its agreement, announced June 29, to acquire the assets of local net maker Fox Research, Inc. The Fox price tag totaled about \$10 million in cash and assumed liabilities.

Separately, 3Com Corp. and Bridge Communications, Inc. said the Federal Trade Commission granted the two companies an early termination of the waiting period required by the Hart-Scott-Rodino Antitrust Improvements Act. That allows them to proceed with merger plans, subject to shareholder approval.

► ANALYSIS

Partnerships key to Doelz's future

Stronger distribution channels a must.

BY PAM POWERS
Senior Editor

IRVINE, Calif. — While Doelz Networks, Inc. could profit from its new partnership with Unisys Corp., the company has suffered from some past setbacks and analysts say it may lack adequate distribution channels to sell a strong product line.

Analysts said the company has to seek other vendor partnerships and increase its sales force in order to compete successfully in the market for high-speed data transmission products. Failing that, one industry watcher suggested the company may one day be acquired by a major computer vendor.

Doelz is the brainchild of Melvin L. Doelz, currently chairman and chief scientist of the company, which was founded in 1979 as a

consulting firm. Backed by more than \$32 million in venture capital, Doelz introduced its first products in 1984. Company officials said Doelz now operates at a profit, but they would not release specific financial information.

Built around fast packet-switching technology, the products are used together to create data networks capable of supporting different protocols and able to replace multiple data networks, according to Vice-President of Technical Marketing Michael Bookey.

Typically, a customer will run several lines from a variety of computers into Doelz's Elite One, a multipoint data concentrator, which packetizes the information and multiplexes it over a single data line to Doelz's Esprit One high-speed virtual circuit switches.

Doelz Networks, Inc.	
Founded:	by Mei Doeiz in 1979, who holds 32 patents in communications
Location:	Irvine, Calif.
Number of employees:	170, 13 on sales staff
Sales:	over \$10M
Products:	based on fast packet-switching technology <ul style="list-style-type: none"> • Elite 1 - multipoint data concentrator • Esprit 1 - high-speed virtual-circuit switch • Engarde Network Communications Control Center
Distribution channels:	<ul style="list-style-type: none"> • 80% direct to end user • 20% joint marketing agreements
Joint marketing agreements:	<ul style="list-style-type: none"> • PacTel Connection — signed 1985 • Network Equipment Technologies, Inc. — signed 1987 • Unisys Corp. — signed 1987
End-user customers:	<ul style="list-style-type: none"> • The Toledo Trust Co. • Seattle First National Bank • KeyCorp. • Michigan National Bank • Marsh & McLennan Companies, Inc. • Chicago Public Library

The Esprit switches deliver the information to remote sites. Rather than being converted, protocols are transported transparently enveloped in packets.

Because the Doelz architecture

eliminates the need to run several data networks, Bookey said Doelz frequently saves large users 30% to 70% of the costs associated with running multiple networks. Bookey

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VENDOR VIEW

BILL BRENNEMAN

Understanding technology avoidance

Technology avoidance occurs when an organization gives up the most cost-effective and efficient communications approach because of the technology involved.

Technology should be avoided only as the result of a conscious business decision.

Case in point: A large retailer linked more than 50 stores and 2,500 point-of-sale terminals primarily through point-to-point circuits when several other approaches would have been more cost-effective.

Why? The user risks losing hundreds of thousands of dollars if a system outage takes down more than one location at a time. In spite of the tremendous expense of point-to-point links, the technology leaves no doubt as to where a problem lies. Outages are more easily managed with the resources available to the user.

Any technology should be

Brenneman is director of engineering at PacTel Spectrum Services.

avoided if it can't be effectively managed and maintained. An organization must have the technical expertise and resources available to handle diagnostics and restoral, and the technology must be easily supported with the resources available.

Take T-1, for example. Five years ago, when T-1 was emerging as a private network solution, multiplexers were not equipped with the self-healing and alarm capabilities they have today. Typically, when a problem occurred, symptoms such as slow response time, busy signals and erratic data had to come in piecemeal before network technicians could tell there was an outage. Then it took time to determine the source of the problem. Sometimes other services were affected when technicians tried to bring the faulty link back up.

Such were the challenges of maintaining T-1 five years ago. Things are better now.

Vendors are offering built-in diagnostics, and training courses are available to help users man-

age the technology.

Clearly, there is a risk in pioneering the application of a new technology. Although going digital via T-1 or fiber instantly improves reliability, a problem can be more catastrophic in nature, especially when built-in diagnostic capabilities and overall maintainability are not mature.

The key to using young or unfamiliar technologies is having the technical expertise to tackle problems. Since diagnostics are not often built-in in the early stages, a very high level of expertise and a wide array of diagnostic equipment and approaches is required to isolate problems.

Technology avoidance manifests itself in a number of ways. Some organizations are still running batch operations. Others have yet to network all applications so the entire organization gets the full benefit of available data. Some companies shell out large sums of money each year to pay for network redundancy instead of stepping up to the

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► PACKET SERVICES

AT&T to expand Accunet

BY PAM POWERS
Senior Editor

MINNEAPOLIS — AT&T said last week it will expand the geographical coverage of its Accunet Packet Service packet-switching network to at least 300 cities by early next year.

AT&T and Control Data Corp. (CDC) agreed to augment their jointly offered Redi-Access service, which provides access to Accunet and supports asynchronous-to-X.25 protocol conversion. Redi-Access is currently available in 150 cities. CDC handles protocol conversion because federal regulations prohibit AT&T from providing such so-called enhanced services.

David Dingus, product manager for Accunet Packet Service, said the number of Redi-Access locations will increase to at least 300 by early 1988 and could go as high as 400, based on user demand.

"All the public packet networks have access in the largest U.S. cities," he noted. "What's important

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FCC proposal unites users

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and are preparing to voice their displeasure to the FCC.

Already, many of the leading user organizations have raised questions about the proposal and have asked for more time to review it. The International Communications Association (ICA), the Telecommunications Association (TCA) and the National Retail Manufacturers Association (NRMA) were among the nearly 40 parties that pushed the FCC to extend the period for formal comment on the issue until Sept. 24.

Telenet user Gevenie Delsol, communications director for Levi Strauss & Co., attended a joint Tymnet/Telenet meeting in San Francisco. Based on information from Telenet, she said, Levi Strauss' annual VAN costs would go from \$1 million to \$1.5 million.

Like other communications managers who attended the meetings, Delsol is attempting to relay the information she accumulated at the meeting to Levi Strauss' top management. "I'm working on an issue-analysis report designed to inform management and users throughout the company of what the FCC proposal means," Delsol said.

The FCC proposal would eliminate the access charge exemption

that enhanced service providers such as Tymnet and Telenet have enjoyed since 1983. The charge, which would be assessed on all enhanced interexchange data communications service providers, would be paid to local exchange carriers that provide dial-up access to these networks. Interexchange carriers and long-distance service resellers have not been exempted from the charge, but the FCC said enhanced service providers merited exemption on a temporary basis because they were fledgling carriers.

Brian Moir, legal counsel for the ICA, said the FCC has not yet clearly defined such key terms as "communications carrier," "enhanced service provider" and "customer." He said ICA members fear that, if the FCC proposal is approved, there would be less competition among carriers.

"If companies like Tymnet and Telenet are really going to be on the ropes, our members could find themselves with fewer communications options," Moir said.

Like other communications managers interviewed by *Network World*, Levi Strauss' Delsol said it was too early to determine what course the company would take if the FCC approves the proposal and rate hikes for VAN service result.

Delsol did say the garment maker's national sales force will be affected if the FCC proposal becomes

law. "We have a 450-person sales force equipped with personal computers that uses Telenet's service to transmit order information to our mainframe computer here at headquarters," she explained.

Paul Noble, a telecommunications planning specialist for Chrysler Corp. in Highland Park, Mich., said he attended the meeting in Tysons Corner. He said the automaker opposes the FCC plan. The company uses services from both vendors to link roughly 4,000 dealerships across the nation to Chrysler's manufacturing facilities.

"The speakers claimed the FCC is bent on approving this plan and it was time for Tymnet and Telenet users to mobilize to fight the plan," Noble said. Chrysler will probably submit a letter protesting the plan to the FCC, he said.

A third communications manager, who attended the Tymnet/Telenet meeting in San Francisco, said he was analyzing the potential impact on his company's communications costs. Bruce Von Herman, telecommunications services manager for Syntex Corp., a Palo Alto, Calif.-based pharmaceuticals manufacturer, said the FCC plan could drive up the company's annual Tymnet bill by 25%. "Although a raise in Tymnet rates wouldn't have a large financial effect on Syntex, we take the situation seriously," Von Herman said. ☐

AT&T to expand Accunet

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is to get outside the city and closer to the user."

Mark LaRow, a group manager with Network Strategies, Inc., in Fairfax, Va., noted that access in 300 cities will put AT&T "at the low end in terms of geographical coverage in comparison with Telenet [Communications Corp.] and Tymnet/[McDonnell Douglas Network Systems Co.], but that's probably enough to suit most corporations' needs."

Dingus said the planned expansion also includes an upgrade to support speeds of 2,400 bit/sec. AT&T also is "taking a hard look at providing synchronous-to-X.25 protocol conversion. We recognize the need to support synchronous transmission but have no firm plans to do so yet," he said.

Dingus said Accunet's increased geographical penetration should help AT&T garner a larger share of the public X.25 transmission market. He estimated the carrier currently holds less than 1% of that market. "I think the Redi-Access expansion and the BOCs' packet nets, which we will tie into, will fuel growth for Accunet," he said. Within the next three to five years, Dingus said, AT&T's market share will grow to at least 7%. ☐

Partnerships key to Doelz future

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came to Doelz from Seattle First National Bank where, as communications manager, he cut networking costs by 60% with the installation of a Doelz network.

"My job [at the bank] was to reorganize the computer complex, and I ended up needing four networks to do that," Bookey explained. "Then we found Doelz and installed a network in 1985 that saved us from having to put four phone lines into every branch bank."

Bookey said Doelz realized at that time that banks were a "natural market" for the company's products, since most run multiple data networks. As a result, Doelz placed increased emphasis on targeting bank customers, although the company "is not limited to that," Bookey added.

The Doelz customer roster is, in fact, heavily weighted with banking customers. And it was the loss of one major contract with a bank

that dealt a blow to Doelz's credibility.

Doelz teamed with Network Equipment Technologies, Inc. (NET) and IBM in 1986 to bid on a large contract for Bank of America National Trust and Savings Assn. While Doelz products passed technical trials with flying colors, a source close to Doelz who requested anonymity said the company did not have products ready to ship and did not allocate enough salespeople to the deal. In the end, Bank of America opted to sign with NET, IBM and AT&T, leaving Doelz in the cold.

Asked to comment on the bank contract, a Doelz spokeswoman said the company "has since settled its relationship with Bank of America."

The Bank of America bid was not the last time Doelz would be paired with NET. Doelz last year considered joining hands with StrataCom, Inc., a T-1 multiplexer

maker whose strength is in voice transmission.

As Bookey put it, Doelz has had an interest in teaming with a T-1 vendor because of the growing interest in integrated voice and data, and Doelz needed an outside company to provide voice network capabilities.

But in the final hour, Doelz signed an agreement in principle on joint marketing with NET, the anonymous source said, because Doelz and NET had common investors who were concerned that NET's stock would drop in value if Doelz elected to team up with StrataCom. The source commented that Doelz would have fit better with StrataCom and that the NET deal has yet to land any business for the company.

The Doelz spokeswoman acknowledged that the StrataCom relationship would have provided the two companies with "complementary technologies," but contended that the NET deal represents a "better business relationship."

This June, Doelz signed an OEM agreement with Unisys that analysts said will probably prove to be a profitable liaison for both companies. Bookey said he expects "a lot of business" to come from that distribution channel and that Doelz already has signed some agreements through Unisys with customers. He would not comment further on those contracts.

Doelz also has a marketing agreement with PacTel Connection, a subsidiary of Pacific Telesis Group, and Bookey predicted that, in the future, an increasing percentage of Doelz' sales will be gen-

erated by joint marketing agreements.

Additionally, Doelz intends to increase its sales force, which now numbers 13 people. Currently, direct sales contribute 80% of annual revenue, and distribution agreements contribute the remaining 20%.

But the source said Doelz has far to go in developing sales channels strong enough to compete effectively. "Doelz has the best technology and the worst marketing of all its competitors out there today. There isn't enough manpower on the sales force, and PacTel isn't geared to sell such sophisticated equipment. Unisys is their only saving grace."

Jerry McDowell, a vice-president with Vanguard Telecommunications, Inc. in Carmel Valley, Calif., said, "Doelz is in the throes of reorganizing because the company now realizes it can't sell product without solid distribution channels and lots of market exposure. I think they're getting on the right track now." McDowell predicted that Doelz will concentrate its efforts on aligning itself with other vendors.

But the anonymous source said he doesn't think there will be a Doelz by next year. "I bet by the end of the year, some very wise computer company will buy the Doelz technology," he surmised, adding that Unisys, Digital Equipment Corp. or Tandem Computers, Inc. would be the most likely candidates.

The Doelz spokeswoman responded, "We think we're an attractive candidate, but we're not up for sale." ☐

Tech avoidance

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merits of shared bandwidth.

The question is whether a conscious decision to avoid technology has been made.

Before deciding to avoid technology, work a thorough cost/benefit analysis to get a clear picture of the costs at stake. A bottom-line perspective is not an instant cure for technology avoidance, but it does cause one to stop and think about the benefits

of using technology.

Whatever technology is employed, skilled people are required to assure that the service is maintained. We can not eliminate the need for human intervention in expert systems.

Equipment is often built to allow an impaired level of service while the repair is being orchestrated. Still, it takes a certain level of skill to operate the equipment and, during the restoration process, the probability for catastrophic failure increases. ☐

TELECOM TRENDS

Phone feature stifles call-waiting tones

A Bell Communications Research, Inc. (BELLCORE) scientist may have found a solution for often-annoying call-waiting tones. Deluxe call waiting, not currently available, can temporarily suspend the call-waiting feature, quell the tone and signal the second caller to try later.

This solution requires complex software to program computerized switches to execute the multitiered signaling between users, telephone company central offices and those placing the calls on the busy line. With the feature, a user could instruct the telephone network to cancel the call-waiting feature by pressing a single digit on a push-button telephone keypad. The second caller would then hear a busy signal.

► PRIVATE NETWORKS

AT&T net center aids user

Control hub facilitates management of statewide network.

BY BOB WALLACE

Senior Editor

MADISON, Wis. — The first AT&T Network Management Center (NMC) ever installed to monitor and control a private network has helped speed network problem determination, facilitate traffic management and simplify reconfiguration of a 1,800-location voice and

data communications network.

The NMC, which is staffed by AT&T personnel around the clock, was built as part of a 10-year, \$200 million contract the state of Wisconsin awarded to AT&T a year ago. The state's 68,000-line Electronic Tandem Network (ETN) consists of four AT&T System 85 private branch exchanges, each located in a different local access

and transport area and connected using AT&T's Accunet T1.5 service ("Wisconsin and AT&T ink voice/data net accord," NW, Aug. 11, 1986).

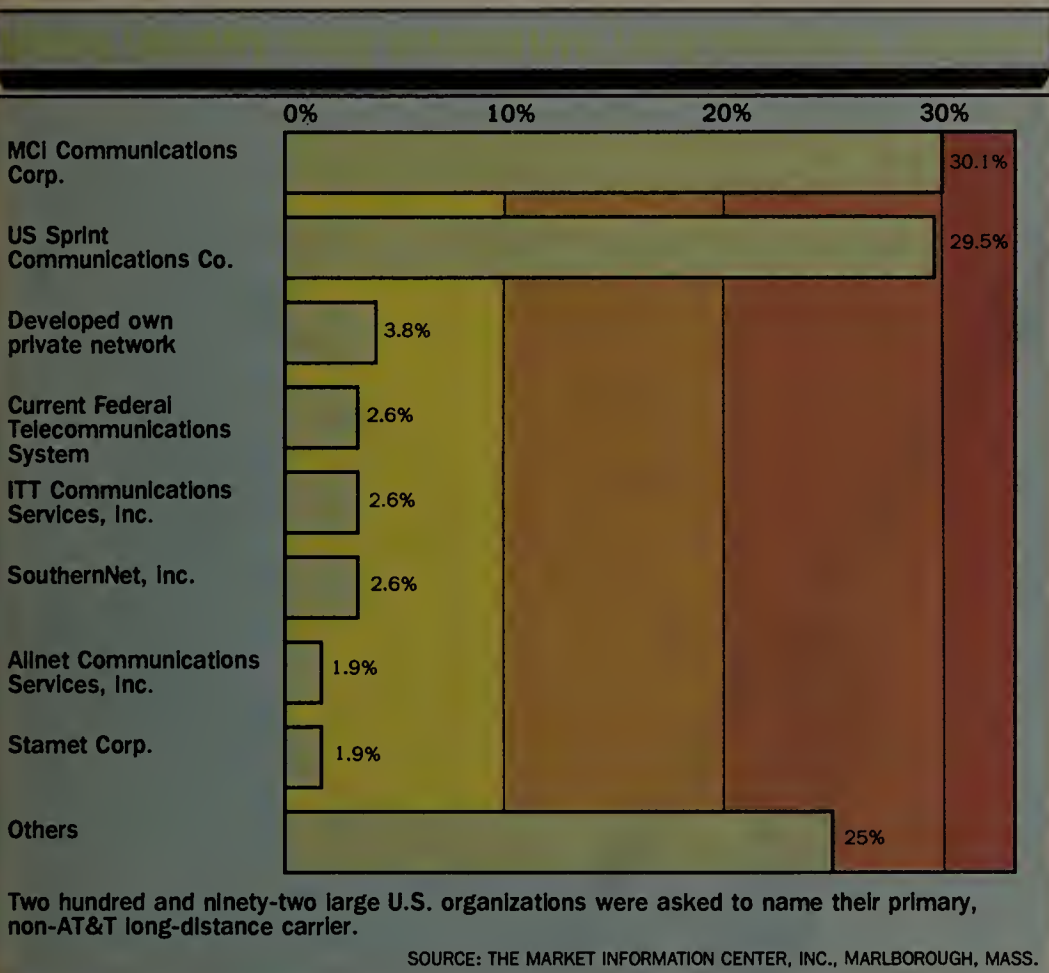
The NMC is part of an existing AT&T facility here. The NMC includes roughly 20 offices and houses several AT&T 3B computers. The 3Bs monitor all equipment located at the four network nodes,

including all PBX trunk lines in the network. The AT&T network management system also tracks the operation of some 500 Codex Corp. modems scattered throughout the state, a requirement stipulated in the network request for proposal.

According to Jody McCann, state telecommunications systems business manager, the NMC gives end users a centralized point of contact for all system woes, including circuit outages, poor line quality and equipment failures.

"If they have a problem, we track it down with the NMC, fix it and call that group back to let them know what the problem was

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► WESTINGHOUSE ELECTRIC

Firm keys in vendors

Program looks to improve service.

BY BOB WALLACE

Senior Editor

PITTSBURGH — Dave Edison, corporate information and communications director for Westinghouse Electric Corp., says sharing the firm's business needs with its vendors and forging closer ties with network end users result in higher quality service.

Once a year, the \$10.7 billion corporation invites its telecommunications service and equipment providers to a 2½-day strategic meeting held at the company's headquarters here. This effort is just one part of a larger program

designed to provide the corporation's network end users with reliable, voice and data communications services.

"At this meeting, we give our major vendors an update on Westinghouse's strategic business plan," Edison explained. "We try to tell them what our needs and objectives are." At the last meeting, Edison and others emphasized the need to identify and resolve network problems before employees are affected.

The corporation also invites key department heads to the annual assemblage. "These users get the

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CROSS TALK

BOB WALLACE

Notes from the field: John Hancock talks nets

A communications manager at John Hancock Mutual Life Insurance Co., a long-time advocate of networking, recently took time out to share his views of and experiences with one-stop shopping, the integration of voice and electronic mail and the problems of keeping tabs on resources within a large network.

Although the company relies heavily on AT&T for long-distance calling services, private branch exchanges and other ancillary gear, Stephen Kelley, telecommunications corporate consulting director for John Hancock, is still concerned about the level of competition in the communications industry, and he frequently sends vendors requests for proposal to assure the firm receives competitive pricing for these resources.

With the help of an outside consulting firm, Kelley recently chose AT&T to provide his company with system management software as well as a PBX, a uniform cabling system and a fiber-optic cabling system to run between buildings.

Many communications managers who have tired of the task of operating a network comprising equipment and services from several different vendors have chosen to rely on a single vendor to fill their communications needs. Others, however, have grown accustomed to competition.

"I don't want to make a

blanket commitment to any one vendor," Kelley maintained. "But," he quickly added, "dealing with a potpourri of vendors is often an unworkable solution. We have just had unbelievable problems with trouble resolution in the field."

Kelley developed a method that he uses to determine the price and performance of other vendors' offerings. "We send out frequent requests for proposal for various equipment and services," he explained. "This allows us to determine if we are receiving competitive pricing and product value. It's a continual validation process."

An early and large user of AT&T's Audix voice messaging system, John Hancock now hopes to link the system with the company's IBM Professional Office Systems (PROFS) text-messaging system.

According to Kelley, instead of waiting for vendors to create an easy link between the two systems, John Hancock may call on its own corps of software development experts to write the code needed to establish the connection.

Kelley said more than 1,000 John Hancock employees already use Audix. He predicted this number will balloon to 3,000 by year end. Linking Audix and PROFS systems would provide additional functionality to users of the now separate systems.

"PROFS users could be noti-

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NETWORKING

AT&T center aids user

continued from page 9

and how it was resolved," McCann said.

"If an end user complains about a noisy line, we can use the NMC to determine when the call was placed, what line was used for the call and how the call was routed over the network," McCann said.

The NMC can also be used to identify switching hardware problems. "The NMC gives us the ability to diagnose and maintain the four network switches from a single location," McCann explained. "For example," he added, "we can change the call-routing in our Appleton PBX, over 100 miles away, from the NMC."

McCann said reports about the day-to-day operation of the statewide digital voice and data net are generated at the NMC for McCann and others. "We receive near real-time network traffic information from the switches and remote PBX modules," he added. "By using the data

AT&T uses to monitor the voice and data network, he said.

Despite the size and sophistication of the NMC, Godfrey said four separate, state-operated facilities, each dedicated to a single state agency, help resolve roughly 85% of all network problems.

End users first dial their dedicated facilities' help desks, using a toll-free

number, when seeking a solution for a network problem. Godfrey explained that each help desk is manned by state personnel who are familiar with the agency's voice and data communications applications.

If the help desk staff cannot solve the particular problem, the information on the situation is passed along to the NMC.

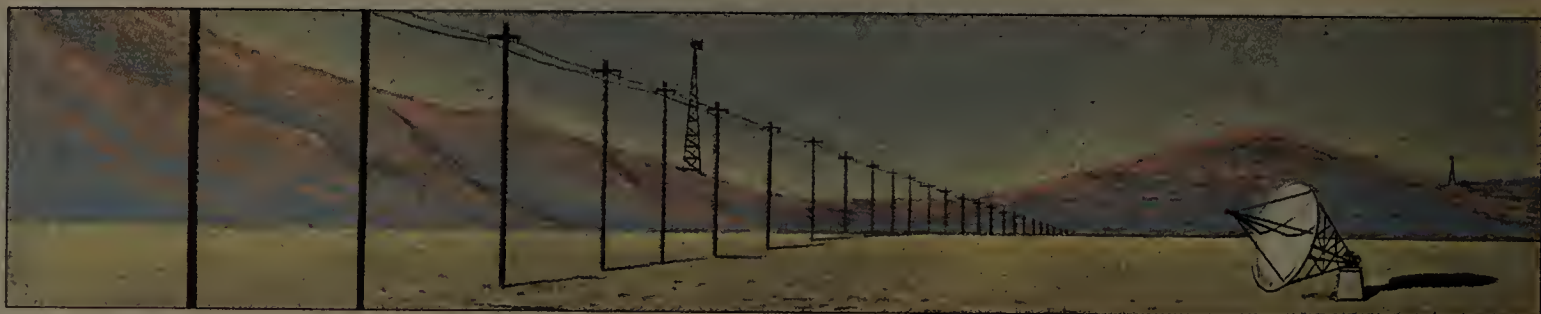
"The state agencies no longer have to call up their local exchange carrier, equipment vendors and other parties to resolve a network problem," Godfrey claimed. "[The agencies] do not have the staff or the facilities to handle problem resolution."

Regarding the decision to implement the NMC, Godfrey said, "We felt it was necessary to have a

center that could monitor the operation of the network with staff that could help resolve problems faster," Godfrey said.

McCann claimed use of the NMC has enabled the telecommunications group to improve their relationship with end users at other state locations.

"They are really pleased with the performance of the network," he said. □



Networking for the real world.

"Racal-Milgo received the highest rating for Overall Performance among network management system manufacturers."

Datapro Research Corporation, User Ratings of Network Management Systems, December, 1986

According to Jody McCann, the NMC gives end users a centralized point of contact for all system woes. "If they have a problem, we track it down with the NMC, fix it and call them back to let them know what the problem was and how it was resolved."

from the NMC reports, we can assure that network traffic is distributed evenly."

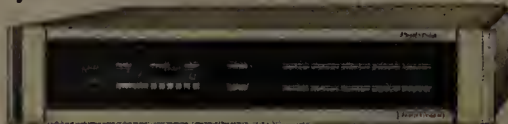
McCann said the NMC polls all trunk groups hourly, and each week the group receives reports on traffic per trunk. "This information allows us to institute changes that would make the current network more efficient, instead of having to add transmission facilities or switching gear to the system."

Rick Godfrey, telecommunications manager for the state's bureau of information, said the state will pay AT&T \$500,000 annually over the next decade as part of the \$200 million contract with AT&T that calls for nine AT&T NMC network managers and technicians. The state also foots a monthly bill of \$380,000 to \$500,000 for the network management equipment and software, located at the NMC, that

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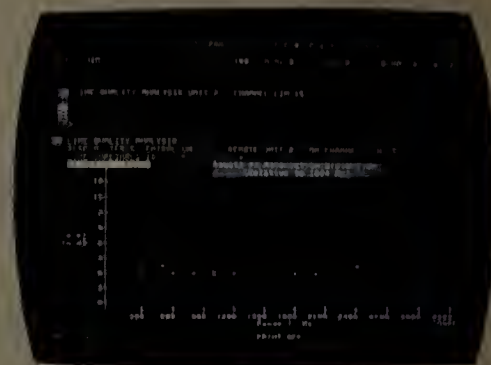
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Notes from the field

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fied on their screens that they have Audix messages, and Audix users could be notified on their screens that they have PROFS messages," Kelley explained.

The quick rise in use of the Audix system will cover its depreciation costs and costs incurred for system maintenance, he said.

John Hancock bills each of its departments for use of the Audix system.

Unlike some users who can't account for the telephones and local and long-distance services their companies' are billed for each month, Kelley, with the assistance of a communications consultant, has creat-

ed an on-line data base on an IBM mainframe computer containing updated inventory data.

John Hancock, one of Boston's largest and oldest Centrex users, decided to address this issue when AT&T assumed billing responsibility for Centrex station equipment after the divestiture of AT&T.

The telecommunications corporate consulting direc-

tor said he will run AT&T's Centralized System Management (CSM) software pack on an AT&T adjunct processor — in this case, the AT&T 3B computer.

Kelley said CSM will be used to archive all data on gear used at the user's Boston locations but would likely not contain information on the company's many field sites outside of Massachusetts.

Kelley noted that John Hancock had used at least one consultant to help his staff get a handle on its telecommunications inventory. However, he is cool on the practice of paying a consultant a predetermined percentage of the amount of savings identified. He said he felt uncomfortable with that type of arrangement and he paid the consultant a flat fee. □

problems *before* they become a crisis. You can monitor data traffic, isolate response time problems, balance line utilization, and store statistics for trending. In short, you get the information you need to simplify configuration management and capacity planning. And the ability to project trends takes the guesswork out of network modification and growth.

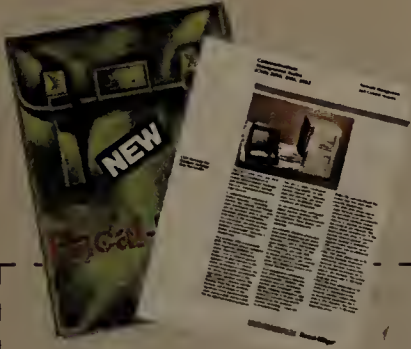
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Firm keys in vendors

continued from page 9

chance to hear our communications plans, critique these plans and air gripes about current service," Edison said. To spread the corporate telecommunications word, Edison's department issues copies of its strategic telecommunications plan to more than 1,000 company managers.

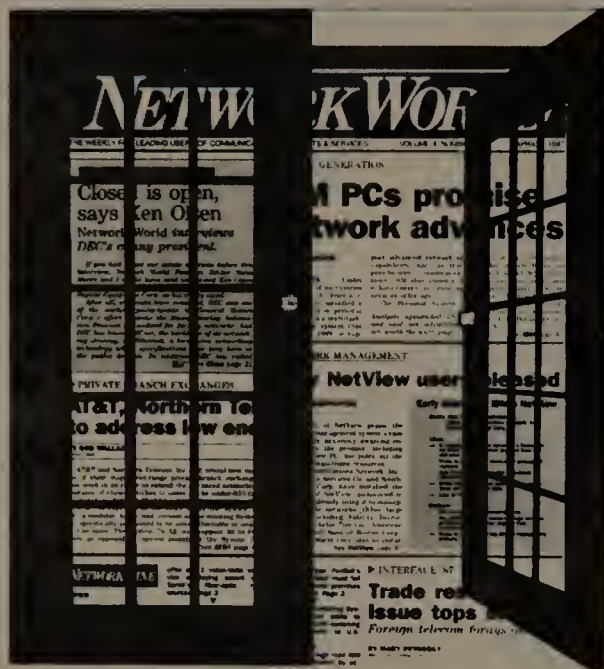
The drive to make its vendors aware of the company's communications needs extends to the field. "In cities or towns where we have network nodes, we meet with our vendors' local service personnel," Edison said. "We explain to them in business terms what this network node means to our corporation.

"To accomplish this task," Edison added, "we first discuss the nature of Westinghouse's business in that geographical area. We tell the service people what the consequences of the node's failing would be." As a result, Edison said, "these critical service personnel get a feel for what network problems mean to Westinghouse as a business. They stop viewing our network as a lot of wire terminating on a frame."

The corporation's communications department also performs extensive surveys to determine whether the networks' end users are pleased with the quality of service they receive. "My staff travels around the country to key Westinghouse locations to meet with senior management and explain to them any important trends in the cost of communications services," he said.

But before the actual visit, a regional Westinghouse telecommunications consultant travels to the site and conducts a formal survey of end users to help identify the strengths and weaknesses of its communications services. "We bring members of our engineering group and technicians to the site to address problems the end users have identified," Edison said. □

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July 20	July 8	Introduction/Overview
Aug. 3	July 22	Wang
Aug. 17	Aug. 5	Hewlett-Packard
Aug. 31	Aug. 19	Apple
Sept. 14	Sept. 2	Data General
Sept. 28	Sept. 16	IBM
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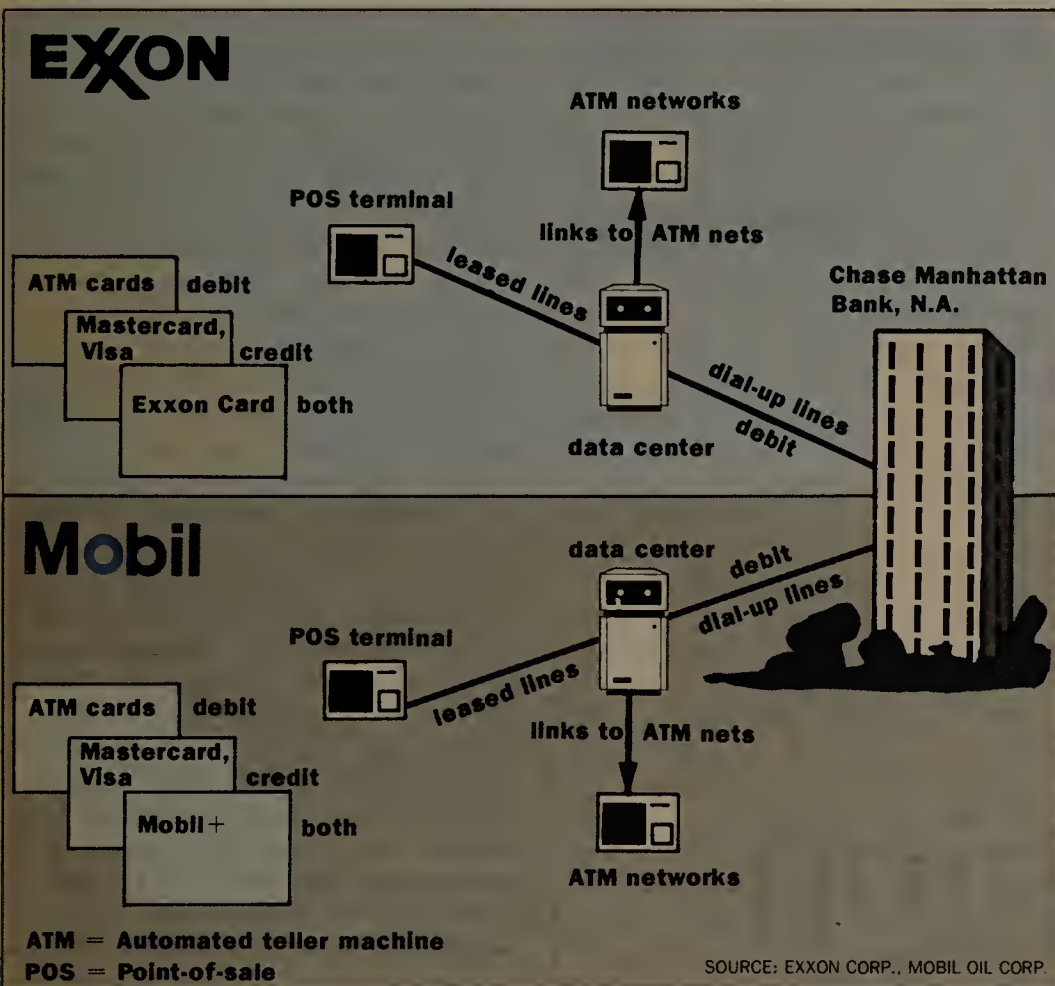
DATA DELIVERY/ NET MANAGEMENT

“Voice and data network management are two different exercises, often completed by two separate sets of employees in a company. I am not sure a user gains much by placing the two functions on one network management system.

Thomas W. McDonald

Principal consultant
MGT Technology Group, Inc.
Waltham, Mass.

Gasoline stations move to POS networks



POINT-OF-SALE NETS

Oil giants bank on POS cards

Exxon, Mobil cards serve dual function.

BY JIM BROWN
New Products Editor

In an effort to boost gasoline sales and increase the use of their existing point-of-sale networks, Exxon Corp. and Mobil Oil Corp. are issuing proprietary credit cards that double as debit cards.

The cards enable customers to purchase gasoline and other products at Exxon and Mobil stations equipped with POS terminals and have the cost deducted from their bank accounts. But the funds will not be immediately deducted, as is the case with the bank automated teller machine network cards that both companies accept as debit cards.

Instead, the oil giants will compile a batch file of daily debit transactions performed with their cards. They will then request movement of funds from the customer's financial institution to their own through an automated clearinghouse (ACH).

The firms are implementing ACH-based POS service as a means of drumming up more business in the highly competitive retail gasoline market. With ACH POS processing, Exxon and Mobil theorize customers will frequent the gas station that has issued them a card

that yields additional payment options over cash.

"One of the things retailers want when they take plastic payment is to build loyalty. Each company wants the card the consumer is using to have their company's name on it," said John Love, publisher of the industry newsletters "Bank Network News" and "POS News."

According to Richard Phegley, a marketing adviser for Exxon, "We're looking at leveraging the investment in card processing equipment to provide added services to our cardholders. And, hopefully, that translates into incremental sales."

The new cards, the Exxon Card and Mobil+, will be added to the list of major credit cards such as MasterCard and Visa that both firms now accept. The new cards also complement agreements both Exxon and Mobil have with several regional ATM networks that enable customers to use bank ATM cards as debit cards at designated stations ("Success fuels Mobil POS net," NW, April 20).

By using the debit option of the new cards, customers receive the same 4 cent-per-gallon discount on gasoline awarded to customers

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FILE-TRANSFER SOFTWARE

Network DataMover VAX, VM versions due

BY PAUL KORZENIOWSKI
Senior Editor

IRVING, Texas — Start-up vendor The Systems Center, Inc. plans to announce by the end of the year new versions of its Network DataMover bulk file-transfer software that run on Digital Equipment Corp. VAX computers and IBM hosts with the VM operating system.

Network DataMover is designed to support large file transfers between various types of computers. The company already has versions of the software that run on the IBM Personal Computer and IBM mainframes with MVS or VSE operating systems. The software is used for applications such as transferring data to a backup data center or updating distributed data bases.

Network DataMover can be operated by a user at a terminal. The software can also be installed so it will run in unattended mode, triggered by an on-line application program or a batch job.

The software transfers files with no intermediate spooling so a user does not have to wait to receive data. Network DataMover includes a data compression capabili-

ty so data can be transferred most efficiently. The product also supports parallel sessions, a feature that resembles a full-duplex connection. See page 16

DATA DIALOGUE

PAUL KORZENIOWSKI

Integrated net management has risks

For years, users have been asking for a network management system that could control all the devices on their networks. IBM was the first vendor to deliver such a system with NetView, its host-based network management system, and NetView/PC, a gateway between NetView and other vendors' network management systems.

Digital Equipment Corp., AT&T and Codex Corp. are expected in the next few weeks to unveil their integrated network management plans. Timeplex, Inc., Digital Communications Associates, Inc., US West, Inc., Network Systems Corp., Net-

work Equipment Technologies, Inc., Avant-Garde Computing, Inc., Infinet, Inc. and Network Management, Inc. have also announced plans to develop comprehensive network management systems.

Users should be wary of committing to just any vendor's network management system. Even though migration from stand-alone packages to an integrated network management system appears to be an obvious step, such a move currently involves substantial risks. Since networks have begun playing a more important role in companies' businesses, managers should think about how much

of a risk their companies should take.

The most obvious risk comes from working with a new technology. No one fully understands the issues raised by integrating network management systems. For example, there are significant differences in managing voice networks and data networks. To integrate the two functions, users may be forced to compromise capabilities of both types of systems. Customers may then discover they have installed tools that cannot adequately monitor either type of network.

Also, the first network man-

See page 16

Net management has risks

continued from page 15

agement systems are bound to be missing key items. Historically, vendors have had to go through two or three releases of a product before all the bugs are out. The first release of NetView/PC, which began shipping in June, requires vendors to make substantial research and development investments to enable their systems to exchange information with NetView.

The second release, which will ship at the end of the year, eases that process. Each future release should make the process easier.

Another risk is that vendors may be only paying lip service to

developing integrated network management systems. Network management is a growing market, but it is not a lucrative business.

Most vendors make few dollars from the sale of the network management system itself. Instead, revenue comes from sales of the communications equipment controlled by the system. For example, a modem maker has a nice markup on its diagnostic modems but often a small one on the central system.

An integrated network management system changes the market's economics.

The modem maker may no longer be able to make up his costs

from diagnostic modems sales.

In addition to developing a system that controls his modems, the manufacturer has to develop links that will control other vendors' equipment. Rather than making a \$50,000 diagnostic modems sale, a vendor may sell a \$2,000 software program that links another vendor's equipment to the company's central system.

The R&D effort needed to develop such links may be more expensive than the cost of developing the central system. Every vendor's network management scheme differs. Linking network management systems together requires as much work as linking networks through standard protocols, such as the International Standards Organiza-

tion's Open Systems Interconnect model.

Currently, there is no group paving the road to network management standards.

Because of the substantial investment, many vendors see network management as a money-losing proposition. When R&D dollars are being divvied up, such propositions are often bumped for projects that promise a higher return on investment.

Some vendors are thinking of ways to circumvent the substantial investment needed for an integrated network management system.

Jack Freeman, senior analyst at Boston-based The Yankee Group, said vendors are examining whether they can use NetView/PC to link their systems to other vendors' equipment as well as to NetView. These vendors have already pledged to develop interfaces from their network management systems to NetView.

By using that link to tie into other companies' network management systems, the vendors save the cost of additional R&D.

They may be able to use the link to control an entire network, even if the customer is not using NetView.

Whether such an approach would work is not clear yet. But this issue is one of many that customers should be aware of as they begin installing integrated network management systems. □

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Telco Research
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Network DataMover out

continued from page 15

nection and simultaneously supports two connections between computers.

With the product, a customer can restrict file-transfer privileges to specific users. The product also works with security subsystems, such as ACF2, IBM's RACF and Top Secret.

The Systems Center, which was founded in 1981, is a privately held company backed by two rounds of venture capital financing. The company has approximately 50 customers, including General Electric Co., Bankamerica Corp., The E.F. Hutton Group, Inc. and MCI Communications Corp.

Steven D. Whiteman, vice-president of marketing at the company, said customers demanded a Network DataMover that ran on DEC VAX computers. One new version of Network DataMover operates under DEC's VMS operating system and works with RMS and VMS files. That version requires VMS Release 4.2, Digital Equipment Corp.'s DECnet/SNA Gateway V1.4 and an LU.0 application program interface. The software ranges in price from \$2,000 to \$20,000.

The second new version runs on an IBM mainframe with IBM's VM operating system and works with CMS, VSAM and tape files. That version requires VM/SP Release 4 with IBM's CMS and GCS, VSE VSAM, VTAM Release 3 and ISPF Release 2.2. The software sells for \$25,000. □

LOCAL NETWORKING

“If Novell destroys the quality service groups that have come to support its products, then the end users will be stuck with just Novell. I think that in no way, shape or form are they in a position to handle direct client support.

A Novell reseller

Commenting on Novell's major accounts division.

NETWORK NOTES

3Com Corp. of Santa Clara, Calif., bit the bullet and licensed U.S. and international patents for token-ring technology held by Olof Soderblom, the technology's self-proclaimed inventor. The terms of the agreement, which mirror an informal agreement that existed between 3Com and Soderblom's firm, Willemijn Holding BV, retroactively cover 3Com token-ring products, according to a 3Com spokeswoman. 3Com will pay a royalty for each token-ring product it sells.

Access Data Products, Inc. of Mount Vernon, N.Y., will set up what it claims is the first electronic bulletin board dedicated to personal computer networking and connectivity. The systems integrator will demonstrate the bulletin board at PC Expo in New York this week and then activate two phone lines for access to the bulletin board at its facilities free of charge. The numbers are (914) 667-1841 and (914) 667-1842. **■**

OFFICE AUTOMATION

AF installs hybrid network

Local On-Line Network System integrates administration.

BY PAULA MUSICH

Senior Editor

The Air Force Systems Command (AFSC) is testing a network-based office system designed to streamline administrative functions in a pilot project that could eventually expand into a \$250 million automation effort.

The Local On-Line Network System (LONS) is intended to consolidate all administrative functions for AFSC users, ranging from engineers to secretaries, at some 15 sites around the country. “The role of LONS is to decrease the cost of acquiring systems for the Air Force by increasing the efficiency of the office via office automation,” explained Captain Guy Giroux, the lead software engineer for the project.

Administrative functions are central to the mission of the Systems Command, which is responsible for developing, acquiring and implementing operational systems for the Air Force. Such systems run the gamut from aircraft systems to radar systems to computer systems.

“The AFSC's three primary goals are to advance aerospace science and technology, adapt advances into the development and improvement of operational systems, and to develop and support the best systems in the most cost-effective manner,” AFSC spokesman Mike Metrook explained.

LONS was developed by the systems division of Computer Sciences Corp. (CSC) of El Segundo, Calif., which works with a variety of government agencies.

LONS includes broadband networking hardware and proprietary networking software from Applitek Corp. and baseband Ethernet hardware and Transmission Control Protocol/Internet Protocol software from Excelan, Inc. The system also includes a connection to the Defense Data Network.

The network is based on an Applitek broadband, dual-cable backbone that links baseband Ethernet clusters or subsegments via Applitek Ethernet bridges. The Applitek broadband network, which supports TCP/IP protocols, includes a proprietary network access scheme and supports data rates up to 10M bit/sec.

The hardware platform for the system includes DEC VAX 8600 minicomputers running DEC's Ultrix operating system and IBM Personal Computer AT clones running Xenix.

Alis, an integrated office automation package from Applix, Inc. that has been ported to run on the 8600, the Personal Computer AT and Altos Computer Systems, Inc.'s Unix-based minicomputers, includes a word processor, business and complex graphics capabilities, a personal data base, spreadsheet, calendaring and electronic mail.

Rather than using the VAX 8600 as a central file server for the network, the AFSC chose to adopt a more distributed approach by running the Alis software in each network processor. Users in a common work group provide access to one another's files by setting up “shared cabinets” in their workstations or on the VAX. Each user also has a personal cabinet for storing private files.

The VAX 8600 houses the network's configuration information and is used to provide network backup, archives for files, support for VT100 terminal users, print services for laser printers, plotters, line printers and optical character readers, modem pooling and gateway services to other local nets at the base. The VAX also acts as the gateway to the Defense Data Network.

Two pilot installations — one at Griffiss Air Force Base in Rome, N.Y., and one at AFSC headquarters in Andrews Air Force Base in Maryland — have installed similar networks that are now running in a production mode after successfully completing 3,000 man-hours of testing, according to Giroux.

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LANMARKS

PAULA MUSICH

The secrets of their success

According to a deep throat at Banyan Systems, Inc., a 3Com Corp. executive snuck into the Banyan Users Group meeting in San Diego last April to familiarize himself intimately with the competition. Following his infiltration of the enemy camp, he wrote an honest and insightful competitive analysis of Banyan to share with 3Com salespeople.

Unfortunately for him, his analysis fell into the hands of our Banyan deep throat and then landed on the desk of a *Network World* reporter. The following are excerpts from his analysis as well as some responses to his report from our Banyan source.

On competitive positioning: “In relation to 3Com, Banyan is pursuing a higher end market than 3Com (larger networks, emphasis on inter-work group communications and SNA communications) and is using different channels of distribution (direct sales). These distinctions may well blur in the near future as Banyan begins to get its sales and marketing act to-

gether and starts to pursue a lower end market through leveraged channels of distribution.”

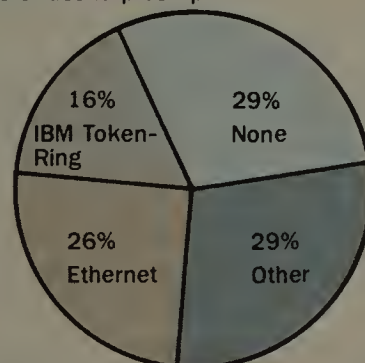
The 3Com sleuth also summarized keynote speaker George Colony's assessment of Banyan's weaknesses. They include a lack of recognition or visibility in the market, a confused distribution strategy and underdeveloped channels, a weak sales organization and the lack of a “departmental resource processor.” With respect to the latter, Colony “sees Banyan as being unable to play that role without a distributed data base and better communications with the IBM mainframe: LU 6.2, DISOSS. A lack of power and performance were also cited.”

Our Banyan source's response to Colony's assessment includes the fact that its sales organization has been reorganized and it recently has brought in record sales for the firm. In addition, LU 6.2 support is expected to be available in Virtual Networking System

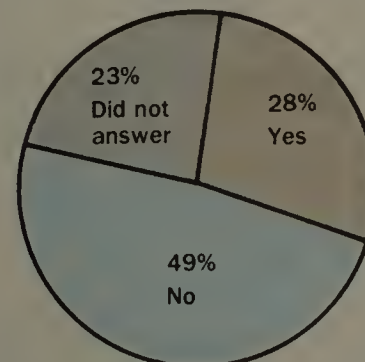
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Local net usage in the financial community

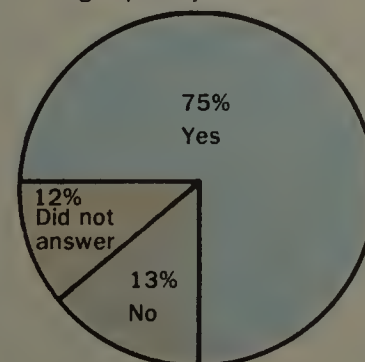
What kind of net, if any, links your users' desktop computers?



Do your users take full advantage of network functions?



Does your company plan to increase networking capability in the future?



SOURCE: COHN & WOLFE, NEW YORK

AF installs hybrid network

continued from page 17

The Rome site links 102 workstations in some 10 Ethernet clusters, and 152 workstations are supported in about 30 clusters at the Andrews site.

Labs and divisions within the AFSC around the country can accept or reject the system, and the system architecture was designed to allow each division's implementation to be tailored to its unique requirements. Thus far, three other sites have asked the electronic systems division, which is responsible for implementing the project, to procure the system for them. "Our goal is to have every unit in AFSC networked, linking a total of

about 13,750 workstations," Giroux said.

CSC, as a part of its contract with the AFSC, is responsible for installing, maintaining and servicing

The contract itself includes an indefinite delivery/indefinite quantity option, which allows the AFSC to be flexible about the project's time frame and total size.

ing the system and training users for the Air Force.

The systems integrator, which has done similar projects for the National Aeronautics and Space Administration, won the contract over several competitive bids from

systems integrators.

"They were chosen for their overall system architecture — a fully distributed, yet integrated design," Giroux explained. "We didn't find a centralized architecture acceptable because we wanted to avoid having a single point of

failure. Also, none of the other packages were fully integrated."

The contract itself includes an indefinite delivery/indefinite quantity option, which allows the AFSC to be flexible about the project's time frame and total size. The

contract also includes a technology upgrade clause that allows newer products or technologies to be used in the system if the products provide a better performance/cost ratio.

Giroux said the AFSC may take advantage of the clause to include Altos minicomputers as an option in the system. The Altos minicomputers, dubbed "shared resource processors," could add flexibility to the system. They could be used to off-load some processing tasks from the VAX where the system load is greater. They could also be used as less expensive alternatives to VAX 8600s, where their larger memory capacity and processing capabilities would not be necessary. The SRPs could additionally provide a less expensive alternative to networking a number of Personal Computer AT-compatibles where the flexibility of the AT is not a requirement, according to Giroux. □

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- Contest sponsored by Communication Networks.

The secrets of their success

continued from page 17

(VINES) 3.0, coming this fall. According to our source, Colony's criticisms were greeted with boos, hisses and cries of, "Do your homework. You don't know what you're talking about!" from the Banyan users at the meeting.

Colony also recently began including Banyan in his "vendors to watch" category, according to the source.

On customers: "In general, the level of customer satisfaction shown by attendees at this event was EXTREMELY HIGH [his caps]. Very few complaints were voiced, and no one I talked to had ever regretted buying a Banyan server. . . . The user conference was a testimony to Banyan's attention to customer relations. The users group is a true users group. That is, it's run and financed by the users themselves. The number of customer attendees was about 75, and most of them had traveled across the country to come. Strong loyalty or the lure of the beach? A lot of both. Conclusion: Banyan stays close to its customers, as it must in order to sell direct. But customer satisfaction is impressively high, and the users group is a big part of keeping the relationship even closer. A big competitive strength."

On relationships with third-party developers: "This is a 'major commitment' to assist third parties in developing applications that will offer 'VINES-like' services. In particular, these developer tool kits will assist the development of server-based applications, notably in distributed data bases — a major theme song of the conference. Banyan will certify third-party applications and will actively codevelop distributed applications. . . . Thrust: Banyan is opening up the architecture in a big way."

Wouldn't it be nice if customers were treated to this type of honesty more often by local networking vendors in their sales pitches? □

COMMUNICATIONS MANAGER

► MANAGEMENT TOOLS

Automating net resource control

Range of options makes for confusion.

BY MICHAEL FAHEY

Senior Writer

The growing complexity of networks is encouraging communications professionals to automate the methods they use to manage resources, but choosing the proper tools from the array can be a complicated procedure.

Facilities management software programs range in price from \$2,000 to \$750,000 and are available for microcomputers, minicomputers and mainframes. The software performs call accounting and billing, equipment inventory, user directory, cable records, network management, work order and trou-

ble ticket generation.

Typically, the software can be bought as a complete package capable of all these functions or as individual packages that provide some combination of these functions. The complexity and sophistication of functions can also vary widely, according to Geoffrey Tritsch, a principal in the Wellesley Mass.-based consulting company Powers Tritsch & Associates, Inc.

Some packages, for example, are based on integrated relational data bases. This enables changes made to one module to be reflected in other data base modules, a feature not common in microcomputer-

Popular profit sharing

About 75% of U.S. businesses tie employee compensation to productivity through pay systems such as profit sharing, according to a study of 1,600 companies nationwide conducted by the American Productivity Center, a nonprofit business research group. Nearly 70% of the companies indicated they had instituted the plans within the past five years, according to the study.

Telecommunications management software

- Available for microcomputers, minicomputers and mainframes
- Ranges in cost from \$2,000 to \$750,000
- Customer can maintain:
 - call-accounting and billing data bases
 - equipment inventories
 - user directories
 - network management records
 - cable records
 - work-order and trouble-ticket reports

SOURCE: POWERS TRITSCH & ASSOCIATES, INC., WELLESLEY, MASS.

based packages, Tritsch said.

Even the functionality of the modules varies by product. There are some call accounting and billing products available that price calls according to carrier down to the last cent, Tritsch explained. Other, less sophisticated software packages may provide only the overall average, per-minute cost for all calls, regardless of the carrier used. These differences account for the great difference in product cost.

"The first thing you have to do when you're choosing one of these facilities management packages is to take a good look at your organization," Tritsch said. "It is the same as if you are going to buy a new phone or computer system; you have to do a needs assessment."

The needs assessment, according to Tritsch, should include an inventory of the organization's equipment, services and physical

See page 20

GUIDELINES

ERIC SCHMALL

Electronic status within the office

Around your office, there are signs and symbols indicating the status you enjoy in your organization. You have a certain amount of floor space, a desk made of what someone has deemed the appropriate material for someone of your status, and, if you are lucky, a carpet of the proper pile depth.

At one very large and well-known corporation, employees have learned to count the tiles in office ceilings and above cubicles as a way of determining the size of the area and thus, the status of the inhabitants.

The traditional cachets of power are now being joined by electronic ones, some of which are the responsibility of the communications manager.

In the area of voice communications, the lowly, yet functional, single-line phone set that can be found on many desks is not a status item. The larger, more expensive, feature-rich phones with multiple station lines usually find their way to "mahogany row," where the executives' genuine wood desks are found. The higher a person rises on

the corporate ladder, the better the chance he or she will have a phone that looks like it belongs at Strategic Air Command headquarters.

In some organizations, the opposite is true. In insurance claim centers or wholesale and retail order centers, where multibutton sets and other call distribution paraphernalia is used, status is indicated by less cumbersome equipment, and the single-line set distinguishes the executive from those lower on the status scale.

In addition to the physical attributes of communications equipment, software can be part of the status game. Long-distance control systems featuring shorter queue times and wider geographic accessibility are a sign of importance within the organization.

Data communications equipment can also be an indication of an individual's relative importance in the organization. Fancy terminals with color graphics capabilities and enhanced memory will generally be indicators of higher organizational rank — unless, of course, the masses need sophisticated terminals to get their jobs done. In this case, the executive mod-

el terminal will be simpler.

The status game may appear small-minded and trivial, but it can have an effect on the communications manager. Some thought should be given when it comes time to assign voice and data communications equipment. Who gets what equipment is a statement of the communications department's judgment of employees' standing in the organization. And bear in mind that the executive who promotes cost-containment measures may not be thinking in terms of his own furnishings and equipment.

In addition to the political implications of assigning equipment, there are capacity and performance issues involved as well. Extra phone features can mean additional private branch exchange line cards, and sophisticated graphics capabilities can tax CPU capacity.

While these issues may not be the most important ones facing the communications manager, some judicious thought in assigning communications equipment and services can avoid bruised executive egos and prevent emergency system upgrades, thus freeing the manager's time for more substantive issues. ▮

ASSOCIATIONS

The Communications Managers Association (CMA) recently elected its new board of directors for the 1987-88 year. Donald M. Gaffney, vice-president of Fundamental Information Systems, will serve as the new president of CMA. Gaffney is also a member of the International Communications Association (ICA), as well as CMA's representative to the International Telecommunications Users Group.

Anthony Mattera, senior systems analyst at Trintex, was elected first vice-president of the association. Mattera served on the ANSI Electronic Data Interchange communications committee and previously served as secretary of the Association of Data Communications Users (ADCU). Jerald V. Marcone, assistant vice-president of telecommunications with Crum and Forster, Inc., was elected second vice-president. Marcone is a member of ADCU and the Telecom Managers Association of New Jersey.

Kurt Mohr will be CMA's new treasurer. Mohr is vice-president of operations at Salomon Brothers, Inc.'s communications services division. Mohr is also active in the ICA and the Wall Street Telecommunications Association. In addition, Ronald Kopitowsky, vice-president of Irving Trust Co., was elected secretary of CMA. He is also ICA's chairman of the executive program committee and professional development committee.

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Schmall is network systems manager for an insurance holding company.

Automating net resource control

continued from page 19

facilities, to determine the amount and type of equipment that will be tracked using the software. This helps in determining the amount of processing power, memory and computer port that will be needed to operate the software.

Carlos Santiago, president of the Harbinger Group, Inc., a consulting company in Norwalk, Conn., agreed that users must assess their needs in order to determine the most appropriate facilities management software package. There are, however, two facilities management functions that are particularly important, Santiago said.

"A service order record is usually sacrosanct," he said. "This is everything that you order, equipment and services, and it is part of the call accounting and billing."

The trouble ticket and reporting function is also an important element of facilities management software, according to Santiago. This function tracks service and equipment problems. It allows users to establish a record of when and where problems occur and how long vendors or staff take to fix the problem.

He also recommended cable record capability, although John Powers, also a principal at Powers and Tritsch, said they were more inclined to recommend cable inventory products only to customers who are planning major network systems. "Otherwise, you probably won't have the necessary cable data to add to the software," Powers said.

The directory function is appealing to many users, Tritsch said. "Directory is an easy sell to management. Without it, you've got the operator shuffling papers and people calling and saying things like 'I talked to Mary in marketing, but I don't know her last name,'" he said. "With a directory, the operator can quickly get the number of everyone named Mary in marketing."

The network management capability included in many software packages helps keep track of services, according to Tritsch. It can be used, for example, to determine circuit end points and identify vendor contacts when problems occur.

This option may include a network optimization package designed to help users configure their networks in a more efficient manner. "This is another area in which users have to consider their particular needs," Powers said. Network optimization packages, he added, can require large data bases and do not necessarily yield savings commensurate with their costs.

According to Tritsch, microcomputer-based software is very effective in managing systems of up to 2,000 lines. Microcomputer products have the advantage of being relatively low priced — up to \$40,000, including hardware, the consultants said.

But personal computer-based systems may not have enough horsepower for some facilities management tasks. "If you have a

lot of call accounting needs, it can place a strain on the PC," Santiago said.

For systems of 2,000 lines or more, users can choose programs that run on minicomputers and mainframe computers.

Once again, the particular characteristics of a user's organization figures into the buying decision. A user, for example, may have excess mainframe capacity available, making a mainframe package attractive.

But, according to Powers, "the telecommunications manager may not want to relinquish control by running the software on one of the

MIS department's mainframe computers. These can be very important issues in an organization. And frankly, it's true that the MIS department often does not share the same sense of urgency as the telecommunications department."

The added expense that may be necessary for reconfiguring a mainframe computer to run the facilities management software must be calculated into the cost of the package, Tritsch pointed out.

Whatever a user's needs, there are certain important qualities to look for in facilities management software packages, according to the consultants. Vendor support is a key issue, they said.

"I'd rather see exceptional implementation of a mediocre pack-

age than have a great package dropped off by United Parcel Service," Tritsch said. Vendors will sometimes offer custom program time, something on the order of 10 hours or so, but Tritsch said that can be a drop in the bucket when it comes to debugging a new system.

Users should require vendors to put the software source code in escrow, where the user can have access to it if the vendor goes out of business, Tritsch said.

According to Powers, the manufacturers of private branch exchanges often do not provide adequate facilities management software. Users should not be swayed by the fact that the software is often offered as part of a package deal with a PBX. □



BUILDING THE NEW LONDON BRIDGE.

Associations from page 19

Elected directors of CMA were Catherine Giddens, voice communications analyst with Johnson & Johnson, Gary S. Schumer, director of telecommunications for United States Trust Co. of New York and Mukesh H. Shah, director of communications for City Federal Savings Bank.

Lee Caputi, a vice-president of Manufacturers Hanover Trust Co. and ICA's vice-president of finance, is the association's first past president. Ken Ringel, manager of telecommunications services at Chemical Bank and a member of the American Banking Association, is CMA's second past president. The board's term began July 1, 1987.

The National Association of State Telecommunications Directors (NASTD) is in the process of establishing a managerial training program to prepare telecommunications managers better. Pam Yost, a spokesman for NASTD, said, "We are developing this program because all of our members have to be telecommunications managers, and we want to foster a program that will train telecommunications people."

Yost also said NASTD is planning to put together a publication that will highlight the association's annual meeting in October. NASTD is currently in the process of soliciting papers to be included in the publication. In addition, the association will publish a semian-

nual listing of upcoming NASTD projects.

In other business, NASTD has sent a liaison committee to the Federal Communications Commission representing those who are in favor of the allocation of an additional radio spectrum for public safety, Yost said.

One of NASTD's long-term projects is a 50-state survey that would list salary levels, personnel, structure of organizations and the cost of various purchases. Yost said the survey is still in its early stages.

The appointment of new officers of NASTD will take place at the October meeting. Yost said the new officers are appointed via a system of ascension, in which the first

vice-president of the association becomes the president and so on.

Professionals in Telecommunications (PROTEL) discussed the different ways companies use data private branch exchanges at its last meeting, according to PROTEL Vice-President Mike Elsesser. Elsesser added that PROTEL is going to branch out by focusing on educational opportunities at Golden Gate University in San Francisco. A recruiter from the university is going to speak to PROTEL members and plans to explain how recruiting and education can go together.

PROTEL recently completed six clinics on voice and data communications, and upcoming events include a seminar with various speakers who will lecture on such topics as Integrated Services Digital Networks and fiber optics. In addition, PROTEL will hold a fall session on network management systems in the San Francisco Bay area.

The Association of Data Communications Users (ADCU) recently elected its new board of directors at the organization's annual convention in Atlantic City, N.J., according to August Blegen, ADCU's executive director. Lou Haring, vice-president of telecommunications at the Chase Manhattan Bank, N.A., will serve as president and treasurer. Alan Carlson, communications manager at Strategic Information Systems, was elected first vice-president, and Pat Ryan, manager of telecommunications networks at Pitney Bowes, Inc., will serve as second vice-president.

ADCU's new secretary is Dick Miller, data communications supervisor at Eastman Kodak Co., and the group's new director-at-large is Ed Hodgson, manager of computers and telecommunications at Westinghouse Electric Corp.

Blegen said ADCU has been interested in the Federal Communications Commission's request for comments on the different methods of regulating AT&T. ADCU has been concerned especially with the price cap for regulation. "This is a very significant issue," Blegen said.

In an effort to increase the association's attendance, the ADCU convention, which traditionally has been held in the summer, will be held in the late spring in 1988 at the Bally Hotel in Atlantic City.

"The reason we haven't been increasing our attendance is because the convention has been held around the Fourth of July weekend, when so many people are away on vacation," Blegen explained.

The International Communications Association's (ICA) president, Bill Coopman, said last week a replacement has been found for Steve Christie, formerly the ICA's executive director. Coopman was unwilling to give further details on the new appointment and said an official announcement will be made in the next few weeks. □



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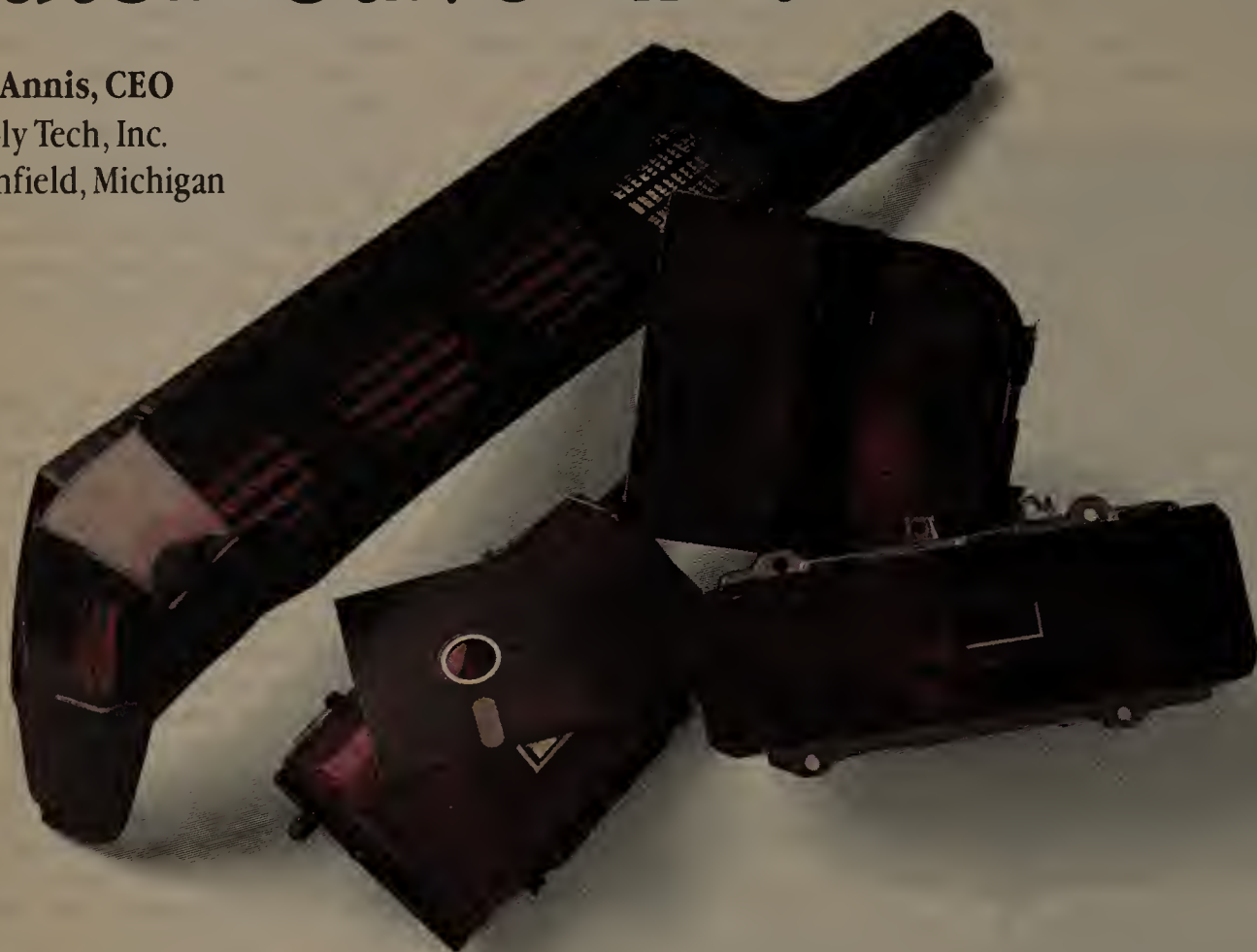
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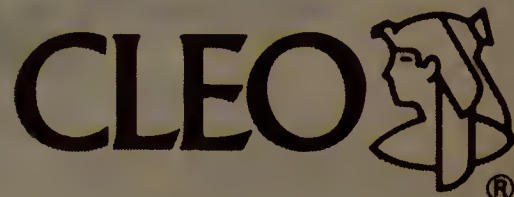
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NEW PRODUCTS AND SERVICES

► SYNOPTICS COMMUNICATIONS

Ethernet at 10M on twisted pair

BY PAULA MUSICH
Senior Editor

MOUNTAIN VIEW, Calif. — SynOptics Communications, Inc. recently announced the commercial availability of Lattisnet, making the company the first vendor out of the gate to offer 10M bit/sec Ethernet over telephone-type twisted-pair wire.

SynOptics also announced that AT&T has certified the product, dubbed Unshielded Twisted Pair Lattisnet, to operate on AT&T's Premises Distribution System, a cabling system for voice and data communications.

The new version of Lattisnet is an extension of SynOptics' existing Lattisnet architecture, which specifies a star topology. It is compatible with existing Lattisnet products, which support Ethernet over IBM's shielded twisted-pair-based Cabling System and fiber-optic cabling. The new version is compatible with 24-gauge D Inside Wire (DIW), the most frequently used wire for current telephone systems, according to SynOptics.

The product includes a new Model 405 Host Module and Model 505 Transceiver, which fit into existing SynOptics local or central concentrators.

"We view this as a new line driver," said SynOptics President Andrew Ludwick. SynOptics will also provide users with guidelines for determining whether existing cabling can be used to support Lattisnet.

The new host module is priced at \$1,900, and the transceiver is priced at \$155. SynOptics estimated that the average price per connection for a system is \$500, which includes concentrators, host modules, transceivers and jumper cables.

Jumper cables that attach to a standard Ethernet Attachment Unit Interface connect workstations to Lattisnet wall outlets. Individual cables connect wall outlets to local concentrators installed within telephone wiring closets. Wire runs cannot exceed 330 ft. Wire closet concentrators are connected to a central concentrator through a fiber-optic cable.

The active wiring system uses electrical power to allow circuitry in the concentrator to perform certain functions, including diagnostic testing, strengthening data signals and retiming packets.

These circuits allow the high-speed Ethernet signals to cover greater distances and enable the system to support a larger number of nodes than a passive system, according to Ludwick. SynOptics also offers redundant power supplies.

AT&T certified that the product operates with a range of DIW cables, from two pair to 25 pair. It also meets Federal Communications Commission emission requirements for this range of cable sizes. Ludwick said AT&T is currently working with SynOptics on joint-marketing experiments for the product. However, he said he can not predict the outcome of these experiments. ☐

► CHANNEL ACCESS UNIT

Device splices test equipment into T-1

CAU can access any voice or data channel in link.

BY JIM BROWN
New Products Editor

MONTGOMERYVILLE, Pa. — Digilog, Inc. is expected to introduce in September a channel access unit that can be used to splice testing equipment into T-1 transmission facilities between multiplexers and line-termination equipment.

The firm's T-1 Channel Access Unit (CAU), slated for introduction at the Telecommunications Association show in San Diego this September, can access any of the 24 voice or data DS0 64K bit/sec channels within a T-1 link.

The CAU accesses the transmit and receive sides of a DS0 channel. It converts the DS0 data formats at data rates of 64K bit/sec, 56K bit/sec, 9.6K bit/sec, 4,800 bit/sec or 2,400 bit/sec. That data is passed over one of the unit's two RS-232 links to either a Digilog or non-Digilog protocol analyzer.

"We are not building this box just for Digilog products. That is obviously our main reason for coming out with it, but it will also work with any other protocol analyzers oper-

ating at up to 64K bit/sec," said Roy Gemberling, Digilog vice-president and general manager.

The CAU has two basic modes of operation. It will passively pass either DS0-level data to the protocol analyzer or DS0-level voice to an external handset for monitoring. The device can also retrieve data suspected of being corrupted, pass it to the analyzer and insert a test signal into the digital T-1 link. The test signal can be measured at the terminal, telephone or other device operating on that channel.

The CAU is controlled via internal software. The menu-driven software is accessed from the keyboard of a Digilog protocol analyzer or from an ASCII terminal attached to the second RS-232 port.

Pricing information

The unit will have an introductory price of \$1,795, according to Gemberling.

Digilog is located at 1370 Welch Road, Montgomeryville, Pa. 18936, or call (800) 233-3151. In Pennsylvania, call (215) 628-4530. ☐

► PROTOCOL COMPUTERS

PCI packet net switch debuts

Can function as concentrator or node in X.25 net.

BY JOSH GONZE
Staff Writer

CALABASAS, Calif. — Protocol Computers, Inc. (PCI) last week unveiled a packet switch that can function as either a concentrator or as a backbone node in a wide-area X.25-based packet network.

The new switch, called the SmartNet 3700, supports up to 16 full-duplex, X.25 links and switches more than 100 packets per second.

Operating speeds

Of the 16 links, as many as four can operate at speeds up to 64K bit/sec, while the other 12 can support speeds up to 9.6K bit/sec. The four high-speed links can be software-configured to terminate in either a V.35 or RS-232-C connection.

The SmartNet 3700 can be used as a backbone node by configuring the high-speed links as trunks used to sup-

port other nodes and configuring the lower-speed ports as network access points. Alternatively, the device could be used as a network concentrator by multiplexing the low-speed access ports over the higher speed network links.

The product features dynamic configuration and network map and routing tables. A built-in management system allows authorized users to configure operating parameters, update routing tables, perform some diagnostics, monitor performance and retrieve statistics either locally or from a remote site.

Net management package

PCI also provides a network management package, the SmartView Network Management System, to support automated management functions, alarm reporting, call accounting, statistics gathering and configuration

updates.

Network administrators set addressing and routing schemes for each SmartNet 3700 in a network including alternate routes used in the event of link failures. Decisions on call routing can be based on information in the address field and the call-user data field. Calls can be forwarded by hunt group. Additionally, permanent and switched virtual circuits are supported.

PCI, a subsidiary of Tele-matics International, Inc., said the product is certified for use on public data networks such as Telenet Communications Corp.'s Telenet, Tymnet/McDonnell Douglas Network Systems Co.'s Tymnet, most international networks and AT&T's Accunet.

SmartNet 3700 is priced at \$6,400. The company is located at 26630 Agoura Road, Calabasas, Calif. 91302, or call (818) 880-5704. ☐

First Look

Codex introduces leased-line modem

Codex Corp. recently announced the **Codex 2510 Data Modem**, a 2,400/1,200 bit/sec leased-line modem designed for point-to-point or multipoint operation. The modem can be operated independently or under the control of Codex's Network Management System. The device is compatible with the Codex 4800 Series Network Management System for medium-to-large networks and the Codex 9300 Series Network Managers for smaller, personal computer-based networks.

When the 2510 is under control of these network management systems, all configuration, monitoring and testing can be conducted by an operator at a central site. When operating independently, the Codex 2510's 16-character alphanumeric display can be used to configure, test and troubleshoot the device. The modem has a magnetic reference manual mounted inside the push-button front panel.

The Codex 2510 is available stand-alone or as a card compatible with the Codex 2000 Series Nest, which can accommodate up to 16 modems.

The Codex 2510 is CCITT V.26- and Bell 201-compatible and is available at the single-unit price of \$1,450.

Codex Corp. is located at 20 Cabot Blvd., Mansfield, Mass. 02048, or call (617) 364-2000.

Racal-Milgo introduces modem encryption option

Racal-Milgo, Inc. recently introduced an **Integral Encryptor Option** for both its Omnimode family of system modems and the RM-Series modems.

Depending on the modem selected, the Integral Encryptor Option offers synchronous or asynchronous communications capability at speeds up to 16.8K bit/sec and operates in point-to-point, multidrop and dial backup applications. The Option is programmable from the modem's front panel for either central or remote-site operation. The Option uses the Data Encryption Standard (DES) algorithm to render information unintelligible during transmission, limiting disclosure of the data to authorized users on the network.

Data is encrypted a single bit at a time, providing protocol and application software independence. Single-bit cipher feedback enables the encryptor to resynchronize itself automatically.

Encryption features offered are on-line-compatible with Racal-Milgo's stand-alone Datacryptor 64, allowing users access to some of the more advanced features of Datacryptor — such as automatic, pretimed key changes based on the time of day and number of days.

The Option's diagnostics facili-

tate troubleshooting, and many self-tests take place automatically upon power up. Operator-initiated tests include loop-back, link-keys test, unattended remote diagnostics, DES S-box, parity check, cipher text inhibit, memory test, cipher text monitor and checkword test, according to the company.

Available in both stand-alone or high-density rack-mountable versions, the Option can be added to most Omnimode and RM-Series modems already installed. Pricing begins at \$850 for the factory installed Option or \$1,000 for the field upgrade kit plus installation. Leasing is also available.

Racal-Milgo, Inc., 1601 N. Harrison Pkwy., Sunrise, Fla. 33323, or call (305) 475-1601.

Alohmon announces RS-232 Consultant software

Alohmon, Inc. recently announced the **RS-232 Consultant**, an IBM Personal Computer software program that can help determine RS-232 pin configurations by getting users to respond to screen prompts. Results are displayed on the screen with diagrams and instructions.

The RS-232 Consultant, the first commercial product for the artificial intelligence consulting firm, is an expert system that draws on common-sense knowledge to give advice about cable connections. It also shows how to start the cable connections, details RS-232 specifications and lists individual de-

vices. Help screens are provided, and the program can show the line of reasoning it used.

Cable connection diagrams with instructions can be printed out. The product's artificial intelligence technology makes it possible for users to customize the RS-232 Consultant to meet their specific requirements.

The RS-232 Consultant is priced at \$89.95, including manual. The system requires an IBM Personal Computer, XT, AT or compatible with a minimum of 512K bytes of memory and DOS 2.0.

An industrial version of the product is also available.

Alohmon, Inc., 433 Wedgewood Drive, Lower Burrell, Pa. 15068, or call (412) 337-8188.



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Software series simplifies telephone management

Summa Four, Inc. introduced a series of software products last week for telephone management and reporting that provides a single source of call collection, sorting, pricing and reporting.

The **Summa Software Series MAXX 500, 700, 1000 and 2000** eliminates third-party buffer boxes and peripheral call-collection devices required by many telephone management products, the company said.

Capable of operating on an IBM Personal Computer XT and select compatibles, features include account-code reporting, resale capability, exception reporting, traffic

reporting and other standard and programmable reports.

Costs for the software series begin at approximately \$1,595 for a MAXX 500, which handles up to 750 extensions. Capacity for the MAXX 700 is up to 750 extensions; for the MAXX 1000, up to 2,500 extensions; and for the MAXX 2000, up to 5,000 extensions.

Summa Four, Inc., 2456 Brown Ave., Manchester, N.H. 03103, or call (603) 625-4050.

Hypercard software links users to others on net

Network Systems Corp. recently announced an interactive software program for its Hypercard net-

works that is based on international standards and is capable of performing language translation among 40 different computer operating systems.

User-Access interfaces with Netex software, Network Systems' software, which is comparable to the session level of the International Standards Organization's Open Systems Interconnect network model.

It uses a simplified set of commands to provide batch and interactive communications functions among similar and different computers and operating systems.

The functions of the User-Access software include interactive file transfer, remote command execution and remote job submission.

Available for IBM MVS, IBM VS, Digital Equipment Corp. VMS, Sun Microsystems, Inc. Unix and Apollo Computer, Inc. AEGIS, the license for User-Access starts at \$8,000.

The software is installed by Network Systems' systems engineers.

Network Systems Corp., 7600 Boone Ave. N., Minneapolis, Minn. 55428, or call (612) 424-4888.

Datatel unveils T-1 channel service unit

Datatel, Inc. recently introduced a T-1 channel service unit (CSU) that is certified for use with AT&T's Accunet T1.5 and Accunet Reserved 1.5 service, as well as equivalent T-1 services from MCI Communications Corp. and US Sprint Communications Co.

According to Datatel, the **DCP3551** meets general requirements for CSUs set by the Federal Communications Commission and by AT&T. It may be used in conjunction with T-1 multiplexers, Digital Access and Cross-connect Systems, D4 channel banks and properly outfitted private branch exchanges.

The DCP3551 can be frequency locked to two external timing sources, a primary and a backup. If the primary source fails, the device will automatically switch to the backup source, and if both external sources fail, an internal clock provides timing. The device handles normal CSU diagnostics, including testing of local and remote data terminal equipment.

The DCP3551 is priced at \$1,750, and quantity discounts are available.

Datatel, Inc., Cherry Hill Industrial Center, Pin Oak and Springdale roads, Cherry Hill, N.J. 08003, or call (800) 424-4451.

Hayes upgrades Smartcom II for Macintosh PC

Hayes Microcomputer Products, Inc. recently upgraded its Smartcom II software for Apple Computer, Inc. Macintosh personal computers to provide compatibility with the new Apple MultiFinder multitasking operating system. The upgraded package, **Smartcom II Version 3.0**, includes support for the Macintosh SE and Macintosh II computers and for Hayes's new V-series modems.

Compatibility with MultiFinder means users can move and resize the Smartcom II windows and use the program simultaneously with other MultiFinder-compatible software.

Support for the V-series modems will let Smartcom II immediately access new functions built into the modems, such as an error-controlled link and adaptive data compression.

Smartcom II Version 3.0 will be available in October for \$149. Upgrades of earlier Smartcom II versions may be made through Hayes Customer Service.

Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, Ga. 30348, or call (404) 449-8791.

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Opinions

BY GREGORY PEARSON
Special to Network World

The Consultative Committee on International Telephony and Telegraphy should adopt the Microcom Networking Protocol (MNP) as the international standard for error control in modems. In any industry, the de facto market standard should be adopted as the official standard. At the very least, any official standard should include the de facto technique in order to be sensitive to users and the marketplace. As MNP is currently the international, industrywide de facto standard for modem error control, it should be chosen in preference to either new inventions or modifications of any existing CCITT link protocol.

No useful purpose is served if standards committees arbitrarily impose a new approach in competition with a technically and functionally adequate technique that is already in widespread use. The adoption of MNP would, in fact, best serve the purposes for which such international standards are made: to meet the needs of both end users and service providers.

MNP error-correcting modems are available today from a wide range of suppliers in diverse segments of the data communications market, including retail stores, mail-order houses and data communications distributors. The current installed base is estimated to be more than 300,000 units. This is increasing at a rate of at least 10,000 units per month, and the rate of increase is also growing rapidly.

The suppliers cited are primarily U.S. vendors, although many have international versions and distribution. There have been indications of additional product development in several European and Asian countries. This is in contrast with LAP D modems; not a single LAP D modem is commercially available today.

In addition to end-user applications, MNP is widely employed by communications service providers such as Telenet Communications Corp., IBM, CompuServe, Inc. and General Electric Information Services Co. International networks that have announced plans to use MNP modems include the Mercury/ICL packet network in the UK and Transpac in France.

The success enjoyed by MNP is due largely to its technical adequacy for use as an error-control technique in modems. It has been in use in modems since 1983 and has been widely implemented by numerous manufacturers. MNP

Continued on page 34

Pearson, the creator of the MNP protocol, is vice-president, technology development at Microcom, Inc. in Norwood, Mass.

MNP vs. LAP D

Advancing technology has brought us the ability to communicate more quickly than ever. Modems operating at speeds above 9.6K bit/sec can transmit a screenful of textual information in less than 1½ sec.

But faster doesn't necessarily mean better. Just as one's score on the standardized typing test is downgraded when errors occur, the useful throughput of high-speed modems is often significantly less than their maximum speed.

Faster modems are more susceptible to transmission impairments and require an error-control mechanism if they are to support useful communications.

Other aspects of modem technology have been standardized to ensure compatibility among different vendors' modems, and to-

day's faster modems now require a standardized error-control protocol.

Study Group XVII of the Consultative Committee on International Telephony and Telegraphy is responsible for developing modem standards and, during the past few years, has been attempting to standardize on an error-control protocol.

Although there seems to be agreement on the general requirements such a protocol should satisfy, there has yet to be agreement on the protocol itself.

The two major candidates currently under consideration are known as Link Access Protocol D (LAP D) and Microcom Networking Protocol (MNP). In this exclusive Network World debate, the champions of these two protocols state their cases.

Which should be the standard for modem error control?



BY FRED M. BURG
Special to Network World

The question at the heart of the modem error-control protocol debate is whether a standard should accommodate only current needs or whether it should also pave the way for the future. Link Access Protocol D (LAP D) is important not only as a modem error-control protocol but also as a foundation for the emerging international standards for Integrated Services Digital Networks.

Link Access Protocol B (LAP B), nearly a twin of LAP D, is a member of the LAP and High Level Data Link Control protocol family and has been used for error-control purposes for more than a decade as part of CCITT recommendation X.25 — the standard for accessing a packet-switched network.

As such, its role is nearly identical to that of a modem error-control protocol. Indeed, recent product announcements show LAP B is readily incorporated into a modem. LAP D provides not only the error-control function for the ISDN era; it also provides enhanced functionality beyond LAP B.

A wide body of knowledge and experience has been accumulated concerning LAP B and LAP D. Many university and commercial courses cover these protocols. As a result of this and the use of LAP B and LAP D in other environments — including general-purpose very large-scale integration — users can expect more efficient and less costly implementation of modems containing LAP D.

Furthermore, LAP B and LAP D have been proven logically correct. This ensures that error-controlled modem-to-modem communications will be free of deadlocks that could otherwise disable systems' abilities to exchange information. For LAP D, this proof is actually part of the standard. In addition, the tests contained in LAP-based testing and diagnostic equipment are themselves the subject of additional standardization efforts.

Therefore, users can expect even more reliability in LAP D error-correcting modems.

Use of LAP B and LAP D in other aspects of telecommunications opens up many possibilities for users and value-added network providers. For example, LAP D's multiple logical-link capability can support multiple intermodem sessions. This could be used for centralized collection of management data via a dedicated LAP D logical link that is separate from the logical link for user-to-user communications.

Performance studies indicate

Burg is supervisor of networking standards planning for AT&T Bell Laboratories in Holmdel, N.J.

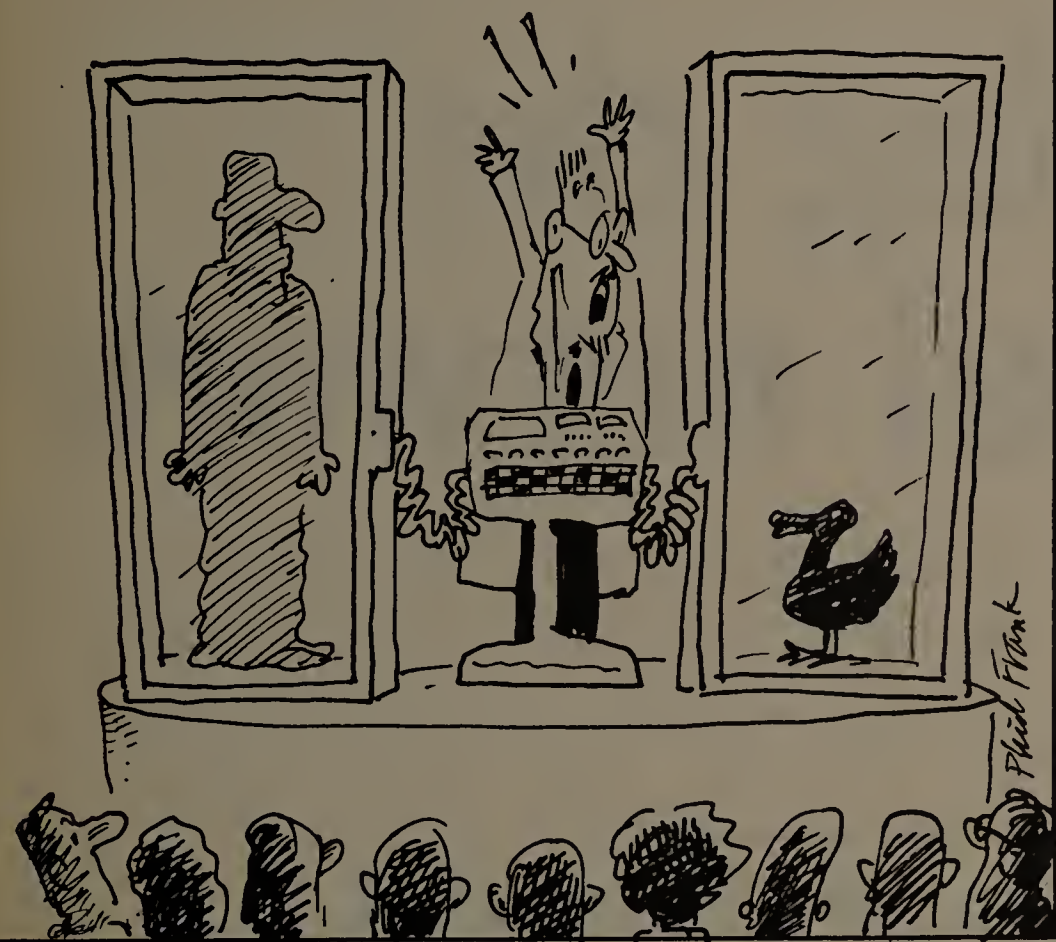
Opinions

► TELETOONS — By Phil Frank

The History of Telecommunications # 114

• Sept. 9, 1987 •

The Air-Ware Corporation introduces its "Tele-Person Networking System." Ten minutes later it is removed from the marketplace.



that LAP D is better than Microcom Network Protocol (MNP) in some environments and performs about the same in others. Functionally, the LAP D error-control proposal is richer than its MNP counterpart. For example, it optimizes procedures for new and existing specialized modem applications such as half-duplex operation and asymmetric operation, in which speeds of the opposite channels can be different and can be changed dynamically. LAP D also contains a forward-abort mechanism, which can be particularly useful over satellite links.

There have been proposals for additional functionality in error-correcting modems during recent meetings of the Consultative Committee on International Telephony and Telegraphy Study Group 7 and the Electronic Industries Association Technical Subcommittee TR-30.1, the group responsible for developing U.S. input to SG XVII. For example, as modem speeds get higher, the ability of a 16-bit cyclic redundancy check (CRC) to detect transmission errors reliably has been questioned. Therefore, a 32-bit CRC may become necessary as speeds increase. And on connec-

tions with long delays, such as satellite link delays, the need to retransmit selectively only erroneous data becomes more important.

While neither of the above capabilities are currently part of the LAP D proposal, they are already standardized in HDLC — of which LAP D is a descendant — and, therefore, are easily accommodated. From the user perspective, one needs protocols that are able to move forward.

In contrast, the only argument for MNP is the installed base of MNP modems. This ties the standard and its users to the existing functionality of MNP, but as user demand inevitably leads to the addition of new functionality, even the installed base argument will no longer be valid.

LAP D is a viable alternative with many advantages over MNP. From a standardization point of view, the choice is clear. Standards should be geared toward the future; tying them to the past results in stagnation. In the words of Kenneth Miller, chairman and chief technology officer of Concord Data Systems, Inc., a company building both MNP-based and X.25-based modems, "LAP D makes sense." □

STANDARDS

DAVID SULSER

Users need ISDN now

The main problem with Integrated Services Digital Networks, as amply illustrated by James G. Herman's recent article ("Is ISDN obsolete?" *NW*, Aug. 10), is that users are confused, vendors are confusing and even consultants have trouble explaining the subject.

Herman's article omits business insight. ISDN is a business utility, and business people are interested in tangible applications, not in how signals are sent through the network.

Sure, voice can be digitized using less than 64K bit/sec, and many applications are running at higher transmission rates, especially over local-area networks. But ISDN is fundamentally an evolution of the public telephone network and is not intended to serve specialized data-intensive operations any more than today's telephone systems can handle all data requirements. Private data lines of varying capacities will continue to exist alongside ISDN. At the same time, no one will stop building multiplexers to squeeze more conversations into a 64K bit/sec channel, if that's what serves their needs.

The significance of ISDN is that it brings a common unit of access — the 64K bit/sec channel — into the workstation. There, business services, many not yet even invented, will be able to reach users virtually anywhere without specialized networks and advance agreements.

The 64K bit/sec channel provides clear voice communications and will be able to handle all media relevant to business services, including data, pictures, facsimile and, in due time, full-motion color video.

Of course, it's a compromise. But users must recognize the opportunity for businesses to improve internal communications and work flow by tying departments together using multifunction workstations. Businesses can also increase market penetration through innovative customer services delivered over universal access facilities.

The information age has certainly arrived, and the large

telephone monopolies and Post, Telegraph and Telephone administrations that form the membership of the Consultative Committee on International Telephony and Telegraphy are not oblivious to the situation. To increase their revenues and benefits, many want to retain ownership and regulate the use of information services. Therefore, two things become clear:

First, ISDN will proceed, because its primary suppliers have already invested huge sums of money.

Second, users must speak up now or their interests may not be incorporated into the final plan.

Regarding other details in Herman's article, primary access in Europe is 30B+D, not 31. Europeans allow 64K bit/sec for overhead (controlling information) within their 2.048M bit/sec T-1 systems, as opposed to the U.S. standard of 8K bit/sec.

Also, fiber-optic technology is on its way to becoming widespread, but that does not mean the average user is going to be constantly communicating at 120M bit/sec in the near term. The purpose of the 2B+D primary access standard is to establish a workable user interface *now*. Greater broadband interfaces can be added without tearing down and recapitalizing the entire system.

Further, the goal of enabling all computers to talk to each other over ISDN via the International Standards Organization's Open Systems Interconnect Reference Model also has a price, and its value won't be recognized until the business requirement for such communications is fully appreciated.

Those who reap the rewards of ISDN will not be those who advocate delaying standards. The innovators recognize the opportunities offered and are moving to implement them.

If ISDN fails, it will not be because of a commitment to 64K bit/sec instead of 16K bit/sec or 120K bit/sec. It will be because business users failed to recognize a global opportunity and to act to ensure that the vision became reality.

It will also be because vendors failed to understand the customers' needs and perspective: that ISDN is a means — not an end. □

Sulser is a research associate at the International Center for Information Technologies in Washington, D.C.

Service Focus: Network design & optimization

Mapping the optimal network

BY MIKE HURWICZ
Special to Network World

Communications managers who are currently mapping their networking alternatives should be aware of three routes that lead to properly designed, fully optimized communications networks.

One popular path is the in-house network optimization study. With appropriate computer and software resources, skilled staff analysts can negotiate this path successfully, given time and support.

If all the necessary elements — resources, people, time, support — don't come together for an in-house study, other routes beckon.

Along the second highway, a legion of equipment vendors, telephone companies, systems integrators, facilities management companies, engineering firms and project management firms offer network design and optimization services. However, such firms tend to bundle network design services with a larger package that entails the purchase of equipment or other services. Or, they may provide the services with an eye to establishing a relationship that leads to future purchases.

The third route — and the one on which this article focuses — is the independent network design

Hurwicz is a free-lance writer based in Nashville.

service performed without any expectation of selling other equipment or services. Typically, the firms that provide such a service have developed their own proprietary software tools, which are a key component of their design consulting approach. These tools may

Sophisticated software can help users find the best alternative.

perform functions such as processing call records, sizing circuits, predicting performance and performing trade-off analyses among alternate vendors, line types and technologies.

When deciding whether to do a design study in-house, users should not underestimate the work necessary for the data collection and rationalization phase. Rationalization is the process of ensuring that all data used in the design

process is correct, relevant and in the proper format. Preparing voice network call records and data network transaction statistics for input to the design software is often the most laborious and error-prone phase of the design process.

"Getting detailed transaction statistics is the hardest part of the design effort," says Robert Ellis, president of The Aries Group, Inc., a consulting firm based in Rockville, Md., specializing in the design of large voice and data nets. "It often takes three to six months to obtain and rationalize the statistics."

Users often underestimate the difficulty of this phase or the extent of their involvement in it, adds Jerry Harder, a senior software consultant with Telco Research, a Nashville-based network design software firm.

"Typically, when doing an in-house study, the user expends a fair amount of effort collecting data," Harder says. "For example, the phone company or PBX manufacturer may tell you a call-detail tape is in one format when, in fact, it is in another. Typically, the user has to go to the vendor or carrier and clarify the format."

A software consultant — one who is familiar with the various problems that arise in connection with data collection and call-detail tapes — can be extremely helpful, Harder says. This assistance is one

Features

August 31, 1987

of several reasons why experience is one of the qualities of a good network design software consultant, he adds.

Another potential advantage of an independent service is its objective viewpoint. "Vendors tend to tailor their designs to emphasize their own products or services," says Greg Jacobsen, president of Telecommunications International,

Inc., an independent network design and consulting firm headquartered in Lakewood, Colo.

"We provide objectivity," adds Jack DiGiuseppe, vice-president of data communications consulting and network design for DMW Group, Inc. in Ann Arbor, Mich. DiGiuseppe sees two possible dangers: The vendor may overconfigure, in order to sell more

equipment or services, or underconfigure, in order to appear to provide a more cost-effective solution. In the first case, the customer immediately pays more. In the second, the customer may go through a period of unsatisfactory service and still pay more in the long run.

Carriers and vendors may also recommend solutions that commit Continued on next page

Network design service vendors

Vendors	Types of network design offered				
	Voice	Data	Integrated	Hybrid public/private	Packet-switched
Contel Business Networks Network Analysis Center Great Neck, N.Y.	✓	✓	✓	✓	✓
DMW Group, Inc. Professional Services Division Ann Arbor, Mich.	✓	✓	✓	✓	**
General Network Corp. New Haven, Conn.	✓	✓	✓	✓	✓
Spectrum Planning, Inc. Richardson, Texas	✓	✓	✓	***	✓
Telco Research Nashville	✓	✓	✓	✓	✓
Telecommunications International, Inc. Lakewood, Colo.	✓	✓	✓	✓	✓
The Aries Group, Inc. Rockville, Md.	✓	✓	✓	✓	*

* Performance and routing optimization services only. No topological optimization services

** Planning services available; no engineering services

*** No software-defined network services

SOURCE: MIKE HURWICZ

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the customer to long-term strategies without mentioning the possible pitfalls of such commitments, says David Townsend, director of research and development for Economics & Technology, Inc., a Boston-based consultancy that does not do network engineering but advises clients on long-term strategic implications of various network design strategies.

"For example," Townsend says, "AT&T is pushing its Software-Defined Network [SDN] right now, and they require customers to commit to a period of time."

"In addition," Townsend continues, "customers have to devote significant resources to putting SDN in place. Today, AT&T might be

able to show that SDN offers the best solution in terms of price/performance. But, if AT&T should raise prices later, it might not be easy for a customer to get out. So

dent service is likely to be more objective than a carrier or vendor," Townsend says. "But, in either case, you have to make sure the design is strategically sound as well

Look for a company that is tuned in to vendor and carrier directions, says DMW Group's Bruce Wilson.

users must scrutinize vendors' designs carefully, taking into account not only technical and economic factors but also strategic implications.

"My opinion is that an indepen-

as technically and economically correct."

Look for a company that is tuned in to vendor and common carrier directions, says Bruce Wilson, director of marketing for

DMW Group. "In putting in a large network, there is a major commitment involved, in circuits and in various kinds of hardware," he says. "It is important to get insight into the life cycle of the technology and get assurance that it will be supported well over the life of the network."

Try a vendor

Karen Johnson, national manager for network optimization at Racal-Milgo, Inc., points out that there are arguments for choosing a vendor to do a design study. "A consultant can often walk away at the end of the job," Johnson says, "but data communications vendors have to live with their recommendations because they have to support the network they design." Racal-Milgo is one of several data communications equipment vendors that offer network design, implementation, management and support services.

Johnson also points out that independent consultants may specialize in circuit optimization, perhaps giving insufficient attention to other aspects of design such as network resiliency or robustness. Racal-Milgo sells the CMS network management system, which is designed to improve network resili-

Racal-Milgo's Karen Johnson points out that independent consultants may specialize in circuit optimization.

ency by allowing customers to monitor, test, reconfigure and restore various types of equipment from a central site.

DMW Group's DiGiuseppe agrees that, in some cases, vendors are best equipped in terms of the knowledge and software tools necessary to do detailed design for their own devices. In such cases, he says, users should look for a consultant who can work with and oversee vendors.

Johnson's experience, however, has shown that customers prefer to coordinate design activities themselves, rather than have the consultants play that central role. In any case, she says, the customer must understand everything and make the final decision.

The choice of a network design service depends largely on who the user thinks will give the best service for a particular study, says Robert Eilers, manager of publications for the International Communications Association, a group representing large telecommunications end users.

"For example," Eilers asserts, "if a smaller company needs a net-



Roy Gemberling, V.P. and General Manager, Digilog Inc.

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work design study, it may be a big job for a consultant, and he or she might do an excellent job with it, whereas a major vendor or carrier might not take that much interest in it. I think service is the determining factor," he continues. "I don't think users are absolutely sold on working with consultants or with a particular vendor or RBHC or whatever."

In any case, most large users do consider independent network design services at some point, Eilers says.

Proceed with caution

In selecting or using an independent network design service, there are several items to consider. Users should make sure the tariff data base used to price the network is as accurate and up-to-date as possible, says John Walsh, vice-president of General Network Corp. of New Haven, Conn. Others agree.

"Even a small error in the tariff data base can lead to a large error in design," says Telecommunications International's Jacobsen. Both General Network and Telecommunications International subscribe to the Q-Tel 9000 tariff data base from CCM/ McGraw Hill, Inc. Jacobsen notes that his company may also check that information against hard copies of tariffs obtained from other sources.

Naturally, all services claim their tariff data bases are accurate and up-to-date. One way of checking this claim is to talk to customers who have compared actual bills with projected costs over a period of time.

Of course, potential clients must also make sure the service's data base covers the tariffs they need. Most services in the U.S. offer tariffs only for North America, and some do not even have Canadian

"I don't think users are absolutely sold on working with consultants or with a particular vendor or RBHC or whatever," says Robert Eilers of the ICA.

tariffs. Most foreign markets are noncompetitive, which reduces optimization issues considerably.

Another important factor, says Bernie Yomtov, senior vice-president at Telco Research, is the client's comfort level. "This is a professional relationship," Yomtov says. "The criteria for selecting a network design software consultant are the same in many ways as the criteria for selecting a doctor or lawyer. You want someone you

trust and can work with closely."

It is important for potential clients to make sure their chosen design firms have experience with their particular types of networks, adds Al Lubin, vice-president of voice consulting with DMW Group. Most have dealt with voice, data and combined voice/data networks, as well as virtual networks such as AT&T's SDN and hybrid virtual/leased-line networks.

If users want to include packet switching in their design, however,

An important factor in selecting or using an independent network design service, says Bernie Yomtov of Telco Research, is the client's comfort level.

they may find that many firms can get involved in the planning but not the traffic engineering of a packet-switched network. (See company descriptions in chart on page 31.)

Tools of the trade

Almost all network design firms use specialized software tools to study, design and evaluate the systems they plan or redesign. In evaluating software tools, one important criterion is how well the tool works within constraints. Both Telco Research and DMW Group emphasize that their tools are designed to allow the analyst to freeze parts of the network while looking at potential configurations for other portions. Tools with this type of flexibility are well-suited to incremental change and migration strategies.

Some software tools use formula-driven simulation, while others use event-driven simulation. With the former, data is reduced to a summary form and then plugged into formulas that yield potential configurations. With the latter, the software actually simulates each call as it is made.

"Formula-driven optimization is like using binomial probability tables to determine how a pair of dice will land over a series of rolls," says Telco Research's Harder. "Event-driven simulation is akin to rolling the dice a large number of times and recording the number of times each number appears on the dice. With large enough traffic samples, the difference between the two should be small."

DMW Group's Wilson says his company's event-driven software may be 3% more accurate in calcu-

Continued on next page

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lating long-distance charges than competing formula-driven software. He points out that for large networks, that may be a significant amount of money.

Wilson adds that using event-driven software may require more skill than using formula-driven software.

Telco Research's Yomtov asserts, however, that the imprecision of the input data is usually such that differences between the event-driven and formula-driven approaches are seldom significant. Of the vendors listed in the chart, all use formula-driven software except DMW Group and Contel Business Networks Network Analysis Center.

One advantage of formula-driven software is that it requires less computer time than event-driven software. Therefore, analysts may be able to consider a greater number of different design scenarios by using a formula-driven package.

"The real bang for the buck is in vendor and jurisdiction shopping," Harder says. "That requires software that can look at many different possible scenarios."

Aries' Ellis agrees that jurisdictional considerations are often paramount. For example, a customer could determine that federal rules

and regulations work to the customer's advantage and opt for a design under federal jurisdiction.

"If end users have no idea what the jurisdiction is, one of the players they deal with — whether it's the local operating company, the long-distance carrier or an equipment manufacturer — may determine that state [public utility com-

Some vendors say they can update tariffs for customers as often as major changes occur.

mission] rules are to their advantage and come in with a design based on those rules," Ellis says.

Racal-Milgo's Johnson cautions against overemphasizing the role of software tools when using a design service. If a carpenter builds a house for you, she asks, are you primarily interested in the tools the carpenter uses or the quality of

the house? Many services also license their software to end users. If you choose to license software, the tool becomes much more important to you, since you will be using it yourself.

There are arguments against licensing software. Ellis says it is not wise to license software for use on customer sites because tariffs change so quickly, it's extremely difficult for a vendor to keep the data current when multiple copies of it reside on various customers' machines. Other vendors disagree, saying they can update tariffs for customers as often as major changes occur.

Independent design companies may license other telecommunications-related software tools, such as telecommunications inventory, billing, attendant directory and call-detail collecting applications. In general, all such tools are unbundled, and users can mix and match services and related applications.

For example, Telco Research's call-detail recording software package can be used with DMW Group's optimization service, and vice versa. However, mixing vendors may add a little bit of work to the design task.

Independent network design and optimization services provide us-

ers with an objective and experienced perspective on their network configuration possibilities. Such objectivity and experience comes with a price tag, but users with complex communications needs may be willing to pay.

However, it may be worthwhile to travel several roads at once, making use of free services from vendors and carriers whenever possible and regularly comparing the toll roads against the free-ways. □

MNP vs. LAP D

continued from page 28

error-correcting modems have been tested and used in many diverse environments, including demanding applications such as cellular telephone and ship-to-shore communications, as well as regular terrestrial and satellite telephone links.

MNP is simple in design and, hence, relatively easy to implement. Because of this, there is much experience in the industry in implementing MNP as an error-control technique. This is evidenced by the number of modem products on the market.

Also, there are several systems houses that perform MNP implementation on a contract basis, including one that has a silicon MNP implementation available. In addition, independent implementors of MNP have, with relative ease, successfully built products that inter-network.

Given the technical capability of MNP, proponents of a LAP D-based approach have not submitted contributions pointing out technical flaws or functional inadequacies of MNP. Rather, in some cases, MNP protocol techniques have been blended into the LAP D proposal. This includes features such as an acking strategy and a break mechanism. This further attests to the technical strength of MNP.

The functionality of MNP is actually a superset of that provided in the LAP D-based proposal, in that MNP not only provides for error-free operation on a modem-to-modem basis but also for error-free terminal-to-modem internetworking. This capability comes from its start-start initiation and negotiated start-stop mode of data transfer operation. Although discussion of error control in start-stop mode data terminal equipment is outside of the Study Group XVII charter, it is an extremely common and useful capability.

In conclusion, it is important to remember the basic reasons why standards are set at all:

- A standard should be designed to ensure interoperability among equipment from multiple vendors.
- A standard should increase the availability of equipment.
- A standard should reduce costs by virtue of standardization.

Ultimately, the end user is best served by standards that are practical. Therefore, MNP should be adopted as the international standard technique for error control in modems. □

Letters:

Editor:

In reading the article entitled "Broadband users share pains, gains" in the July 20 *Network World*, I found it to be lacking in substance and generally misleading. Michael Krugman had his work cut out for him, considering the equipment he had installed was the very first broadband data network offering from the manufacturer and, as with any new application of a technology, unexpected bugs had to be ironed out. However, the medium has evolved considerably over the last five years, and most of the problems he cited simply no longer apply.

It's difficult to compare baseband to broadband. For some applications, baseband is more efficient and cost-effective, and for other applications, broadband is clearly less expensive and more flexible. Your needs drive the decision between the two. Broadband may be a little more difficult to install, but you are building in added capabilities that make the effort worth it. Granted, a broadband system requires radio frequency [RF] modems to handle the analog/digital situation, but baseband uses transceivers in the same capacity. Recent advancements in RF technology have made them comparable in cost and surprisingly less complex than you might expect.

Most broadband equipment manufacturers have addressed

the problems mentioned in the article. For example, our system performs collision detection by the bit-comparison method in the digital domain, and our modem signal levels are self-adjusting. If designated properly, broadband data networks require less precise measurement of cable runs and placement of amplifiers than video or cable TV. Also, contrary to the article, the amplifiers do not have to be placed closer together on the cable. The television signals have exactly the same attenuation characteristics as data signals, and a well-designed modem does not drift. As far as signal-to-noise ratio goes, it typically must be greater than 40 db for broadcast quality video. Many data channels will operate with signal-to-noise ratios as low as 20 db for data, which is much more tolerant.

The technological advances made in broadband cable components have greatly improved reliability. The development of fail-safe features such as amplifier-status monitoring is a prime example of a mature technology that can monitor and isolate problems on the network.

In all fairness, the article is based on installations that were the first of their kind and doesn't really reflect current information for readers who are researching evaluations of the medium.

Rod Matheson
President
Lanex Corp.

Editor:

I have reviewed your "Data Delivery/Net Management" section from the beginning of our subscription, and I find that it's long on network management and short on data delivery. I would really enjoy seeing an article on how data distribution is performed in large, principally IBM, multivendor networks.

I have examined IBM's Systems Network Architecture Distribution Services architecture, which seems an ideal candidate for describing how data is to be distributed, and IBM's Distributed Data Management, which seems a good choice for describing what to do with data when it is received, but IBM has told me these architectures are exclusive; they occupy independent/parallel "towers" on the Advanced Program-to-Program Communications base.

How are other companies distributing program and file updates to 10,000 Personal Computers, or 2,000 Series/1s, or Tandems or NCR/Towers? Do they use an independent transmission vehicle for each, or has someone devised an integrated solution to all these problems? I would be interested in hearing.

Paul D. Gillen
Software evaluation
and development
J.C. Penney Co., Inc.

Letters may be edited for space and clarity.



Open Systems: How open are they?

The Cupertino connection

Continued from page 1

products at the Macworld Exposition in Boston heralded a new era in Macintosh connectivity, but the first salvo in Apple Computer's bid to lure large corporate users was fired last January. Declaring 1987

Belitsos is president of Telematics Research, a San Francisco-based research and consulting firm. He is coauthor of Business Telematics (Homewood, Ill.: Dow Jones-Irwin, 1986).

Apple's "year of desktop communications," Chief Executive Officer John Sculley launched a long-awaited connectivity assault on the gates of corporate America by unveiling an array of networking products.

Included in the Cupertino, Calif.-based firm's January rollout were three long-awaited components of departed founder Steve Jobs' "Macintosh Office." These included the AppleShare file server software, the AppleTalk personal computer card, a link to the IBM Personal Computer and a new line

of open Macintoshes (the Macintosh II and Macintosh SE). But while these products attracted attention within the personal computer industry, they weren't enough to stir enthusiasm among network managers looking for multivendor connectivity.

Apple's Macworld Exposition announcements reveal the company's strongest foray yet into the multivendor communications arena. Products slated for release include an Ethernet connection (EtherTalk Interface Card), Macintosh-

Continued on next page



From previous page
to-IBM Personal Computer file sharing software called AppleShare PC and a new multitasking Macintosh operating system dubbed MultiFinder.

Mac strategy

Central to Apple's strategy is

ary. Tangent Technologies, Inc.'s Tangent Share currently provides this capability, however.

Also, while several third-party options now exist that connect Macintoshes via Ethernet, users will have to wait until October for Apple to ship its own 802.3-compatible Ethernet adapter. In co-

session to the IBM world was its AppleLine Protocol Converter for the 3270, announced in January 1985. Aside from a strong set of third-party DEC connectivity products — such as Alisa Systems, Inc.'s AlisaTalk, which lets users create a virtual AppleTalk network on a VAX — Apple's multi-vendor communications offerings didn't go much beyond terminal emulation and file sharing. "In the 1985 time frame," Hirshberg says, "Apple was not nearly as aggressive in the multivendor arena."

Today, however, Apple's view has changed. The company has in-

3270 terminal emulation but lacked file-transfer capability. AppleLine 3270 File Transfer software, introduced this year, transfers files between Macintoshes and the 3270 environment via the AppleLine Protocol Converter. This also means that Macintoshes can share data with IBM Personal Computers that use Irma cards and Irma host software.

One Macintosh-to-mainframe development has been the recent introduction by Digital Communications Associates, Inc. of Irma cards for the Macintosh SE and Macintosh II. But one hole in Macintosh-

AppleTalk communications architecture
Chart 1

Application layer	Application-specific protocols
Presentation layer	AppleTalk Filing Protocol PostScript (Adobe systems page layout standard) Future: X.400
Session layer	AppleTalk Session Protocol AppleTalk Data Stream Protocol Printer Access Protocol
Transport layer	AppleTalk Transaction Protocol Echo Name Binding Protocol Zone Information Protocol Routing Table Maintenance Protocol
Network layer	Data Delivery Protocol Future: X.25
Data link layer	AppleTalk Link Access Protocol Ethernet (IEEE 802.3) Future: Token ring (IEEE 802.5)
Physical layer	Twisted pair (AppleTalk Personal Network Cabling, telephone wire), coaxial, fiber optic, private branch exchange
SOURCE: APPLE COMPUTER, INC., CUPERTINO, CALIF.	

its AppleTalk communications architecture (see chart 1 on this page). Peter Hirshberg, marketing manager for desktop communications at Apple, says, "AppleTalk isn't Apple-centric. It's a full seven-layer protocol used to link the Macintosh directly to DEC and MS-DOS environments. Also, third parties provide gateway devices that link AppleTalk to SNA and provide DECnet and TCP/IP support."

AppleTalk is part of Apple's overall communications strategy, dubbed the Apple Communications Framework (ACF). In ACF, says Hirshberg, "We've laid out the rules of the road — the framework that defines our workstation technology, network strategy, printing strategy, internetworking strategy and multivendor integration strategy — and incorporated into that tools like AppleTalk for VMS." (See chart 2 on this page.)

"Third parties build on top of that, and as long as they follow the rules, the products are interoperable. Apple's role is to build enabling technologies and work with third parties to make services emerge." (For a list of third-party products, see chart 3 on page 37.)

While Apple has many products planned, current off-the-shelf multivendor communications capabilities are far from complete. The AppleTalk personal computer card, which shipped in February, lets IBM Personal Computer users connect to AppleTalk networks, but they're limited to printing documents on the LaserWriter. Think Technologies, Inc.'s InBox/PC, however, provides transparent Macintosh-to-IBM Personal Computer electronic mail and file transfer. IBM Personal Computer users who want to access the AppleShare file server will have to wait for AppleShare PC, which won't be available until next Janu-

development with 3Com Corp., the EtherTalk card for the Macintosh II will provide AppleTalk support on an Ethernet at 10M bit/sec and will work with both the Macintosh operating system and Apple's AU/X Unix operating system. AU/X will be available late in 1987. Apple also plans IBM Token-Ring Network support, but no date

Apple's Peter Hirshberg says, "AppleTalk isn't Apple-centric. It's a full seven-layer protocol used to link the Macintosh directly to DEC and MS-DOS environments."

has been announced. Finally, MultiFinder's multitasking capability could let Macintosh users run communications in background mode while they work with applications in the foreground. However, users will have to wait for Apple or third parties to develop the necessary applications that take advantage of this new operating system.

Multivendor connections

Apple's January announcement was a remarkable turnaround. Previously, the company's only con-

Multivendor connectivity provided by
Apple Computer, Inc.

Chart 2

Connectivity provided now

Digital Equipment Corp.

- AppleTalk for VMS — Implementation of AppleTalk network protocols under VAX/VMS. Development environment for AppleTalk Services in VMS
- MacTerminal — VT100 terminal-emulation software

IBM

- Apple PC 5.25 Disk Drive — MS-DOS drive for Macintosh SE and II
- Apple File Exchange Software — document conversion between leading Macintosh and MS-DOS word processors. Included with Apple 5.25 disk drive
- AppleTalk PC Card — provides IBM Personal Computer access to AppleTalk printing, mail and file services
- AppleLine Protocol Converter — converts from synchronous to Systems Network Architecture or asynchronous. Provides IBM 3278 Model 2 terminal emulation. Copy & Paste, Copy Table supported by MacTerminal software
- AppleLine 3270 File Transfer — software application for AppleLine provides file transfer from TSO and CMS environments. Uses Irma host file-transfer software

Connectivity provided in the future

Digital Equipment Corp.

- EtherTalk expansion card for Macintosh II — Ethernet support for Macintosh II, available late 1987

IBM

- AppleShare PC — allows file sharing between Macintosh and MS-DOS computers, available January 1988
- AppleShare for MS-DOS — AppleShare file-server client software for MS-DOS personal computers. Will provide transparent information sharing with Macintosh
- Support for LU 6.2, PU 2.1, 3270 Enhanced Connectivity Facility and Token-Ring Network

SOURCE: APPLE COMPUTER, INC., CUPERTINO, CALIF.

troduced several connectivity products for DEC and IBM users, and third parties provide connectivity with Hewlett-Packard Co., Prime Computer, Inc., Tandem Computers, Inc. and Wang Laboratories, Inc. environments.

"We see the DEC environment as very strategic, and with AppleTalk for VMS, Apple has mapped the entire AppleTalk protocol suite in the VAX," Hirshberg says. "It's an enabling technology for developers to build tools that provide both AppleTalk and DECnet services from the VAX to the Macintosh." Apple relies on third parties to provide such services as AppleTalk file service, access to DEC files, AppleTalk and DEC printing services and terminal service.

In the IBM arena, Apple rates better for its links to the IBM Personal Computer world, most of which are provided by third parties, than in IBM mainframe connectivity. Apple-provided products include such products as the AppleLine 3270 Protocol Converter, which lets Macintoshes share information with IBM mainframes via terminal-emulation software. Until recently, Apple provided

to-mainframe connectivity remains: The Macintosh still has no LU 6.2 support. According to Hirshberg, this is under development. "Users will see applications such as DISOSS support in 1988, and we'll begin working with developers in 1987," he says.

Currently, no Apple products support IBM's Network Basic I/O System protocol. "We're following the protocols IBM declares as strategic, such as LU 6.2," says an Apple spokesman, "and it's not clear whether IBM will, in the end, support NETBIOS." An alternative is 3Com's recently announced 3+ for the Macintosh, which enables file transfer between NETBIOS and AppleTalk environments.

Improvements arrive

One obstacle Apple faces in the corporate environment is the perception that the AppleTalk Personal Network, at 230.4K bit/sec, is wimpy relative to the popular 10M bit/sec Ethernet and that it does little more than link Macintoshes to Laserwriter printers. Hirshberg says that capacity is not an issue with users, and he points to Apple's claim of 70,000 installed net-

works as proof. In addition, he says, the EtherTalk card, which will ship in October, will provide users with an Ethernet alternative.

Another problem was that, while the hardware interface for AppleTalk was built into the Macintosh from its inception in 1984 (the AppleTalk network architecture itself was introduced in January of 1985), initially, neither Apple nor third-party vendors made much use of AppleTalk for multi-vendor connectivity. Terminal-emulation, file-transfer and protocol-conversion software became available in 1986, and it wasn't until this year that more sophisticated products were introduced for DECnet and SNA.

According to Chris Bryant, Apple's marketing manager of desktop communications, the new Mac-

"There are two prongs to Apple's desktop communications strategy. On the one hand, the company intends to provide superior communications solutions based on innovative technology. AppleShare is an example of this. On the other, we will eliminate lockouts by integrating into multivendor environments. Products like the AppleTalk PC card and EtherTalk are examples of this."

— John Sculley,
Chief executive officer
and president of Apple Computer, Inc.

intosh SE (with one expansion slot) and the Macintosh II (with six slots) allow for the first time the insertion of add-on connectivity

hardware, "but the machine has always had open interfaces in terms of software."

"AppleTalk is a CPU-indepen-

dent network protocol architecture," says Gursharan Sidhu, Apple's manager of network systems development and the father of AppleTalk. "It's completely open, has been from Day 1, and it has been part of every Mac from the beginning. Everything in the architecture has been published."

Guy Mariande, president of the AppleTalk Developer's Association and vice-president of Tangent Technologies, calls AppleTalk "a typical ISO 7-layer network architecture. The lower layers are well-documented and supported. There have only been a couple of significant changes and additions in the last two years." These include the addition of AppleTalk Session Protocol and AppleTalk Filing Protocol (AFP), which provides users

Continued on next page

Multivendor connectivity provided by third-party vendors

Chart 3

Connectivity provided now

Data General Corp.

- KAZ Business Systems, Inc., New York
- MacDasher — file-transfer and DG D210 terminal-emulation software

Digital Equipment Corp.

- Allsa Systems, Inc., Pasadena, Calif.
- AllsaTalk — AppleTalk network file, terminal and print service

- Dove Computer Corp., Wilmington, N.C.
- FastNet — Macintosh small computer system interface (SCSI) to Ethernet intelligent controller

- Kinetics, Inc., Walnut Creek, Calif.
- Fastpath — AppleTalk personal network to Ethernet cabling programmable gateway. Supports AppleTalk, Transmission Control Protocol/Internet Protocol. DECnet support planned
- EtherSC, EtherSE — direct SCSI and Macintosh SE connection to Ethernet. Supports AppleTalk, TCP/IP. DECnet support planned
- AppleTalk Q-BUS expansion card — direct AppleTalk personal network connection for Micro VAX II

- Odesta Corp., Chicago
- Hellx VMX — Macintosh multiuser data base can run on Macintosh or VAX (under AppleTalk for VMS)

- Pacer Software, Inc., La Jolla, Calif.
- PC Link — Macintosh/VAX network file, terminal and print service

- Peripherals Computers & Supplies, Inc., Mount Penn, Pa.
- Versaterm Pro — VT100, Tectronix graphic terminal-emulation software

- 3Com Corp., Mountain View, Calif.
- Macintosh II Ethernet expansion card
- Direct Macintosh II Ethernet expansion card

- White Pine Software, Inc., Nashua, N.H.
- Mac 240 — VT100, VT220, VT 240 terminal-emulation software
- Regis — Macintosh-to-DEC 240 Regis graphics translator

Hewlett-Packard Co.

- Tymlabs Corp., Austin, Texas
- MAC2624 — HP 3000 and 10000 terminal-emulation and file-transfer software

- Walker Richer & Quinn, Inc., Seattle
- Reflections for the Macintosh — HP 3000 and 9000 terminal-emulation and file-transfer software

IBM

- Avatar Technologies, Inc., Hopkinton, Mass
- MacMainframe DX — Systems Network Architecture/asynchronous protocol converter for Macintosh 512 and Plus. Supports terminal emulation and TSO, CMS, CICS file transfer
- MacMainframe SE — 3278 expansion card for Macintosh SE. Emulates 3278 Model 2 and 5, TSO, CMS, CICS file transfer using Avatar host software

- Centram Systems West, Inc., Berkeley, Calif.
- Transcendental Operating System — AppleTalk network file server for MS-DOS and Macintosh computers

- DataViz, Inc., Norwalk, Conn.
- MacLink Plus — asynchronous file transfer between popular MS-DOS personal computers and Macintosh applications

- KMW Systems Corp., Austin, Texas
- Series II, III Twinax Protocol Converters
- S/3XLink Macintosh application software — 5251, 5291 terminal emulation and file transfer

- Lutzky-Balrd Associates, Calabasas, Calif.

- UltraOffice — networks IBM Personal Computers and Macintoshes via Unix

- Tangent Technologies, Inc., Norcross, Ga.

- Tangent Share — file server for Macintosh and MS-DOS computers

- Think Technologies, Inc., Lexington, Mass.

- InBox/PC and InBox/Mac — electronic mail and file transfer between Macintosh and MS-DOS personal computers on AppleTalk, Token-Ring

- 3Com Corp.

- EtherSeries Enhanced Macintosh, 3Plus Macintosh — provides parity network services to Macintosh and IBM Personal Computer

- TriData Corp., Allentown, Pa.

- Netway 1000A — AppleTalk-to-SNA gateway

- Wall Data Corp., Redmond, Wash.

- DCF II protocol converter
- MacBlue 5251 and FTX host software — 5251, 5291 terminal emulation, file transfer, and Synchronous Data Link Control connect

Prime Computer, Inc.

- Prime Computer, Natick, Mass.
- Primelink Software — file transfer, virtual terminal, virtual printing, Prime PT2000 terminal emulation

Tandem Computers, Inc.

- Menlo Business Systems, Inc., Los Altos, Calif.
- MacMenlo — Tandem 6520 and 653X terminal emulation and text/graphic file transfer
- Foundation Graphic Toolbox — allows Tandem Computer-resident graphic data base to use Macintosh as workstation
- MAX — host-based file transfer between Tandem and Macintosh

Unisys Corp.

- IBM Electronics, Hazelwood, Mo.
- APC-Univac — asynchronous protocol converter supports Unisys Uniscope synchronous protocol

Wang Laboratories, Inc.

- DataViz
- MacLink Plus/VS — Wang word processing/Macintosh document interchange and file transfer

- Omnigate Corp., San Francisco

- The AllegroServer — Wang terminal emulation, Wang-to-Macintosh document interchange and file transfer

Connectivity provided in the future

Digital Equipment Corp.

- Technology Concepts, Inc., Sudbury, Mass.
- CommUnity for the Macintosh — DEC terminal emulation, file transfer and network management (available late 1987)

IBM

- AST Research, Inc., Irvine, Calif.
- Mac-86, Mac-286 — MS-DOS coprocessor board for Macintosh II and SE. Will let Macintosh run IBM Personal Computer XT or AT software (available late 1987)

- Digital Communications Associates, Inc., Alpharetta, Ga.

- MacIrma SE, MacIrma II — 3278 internal expansion card for Macintosh SE and II. Supports Irma, Forte and IBM Personal Computer 3270 host software (available late 1987)

Note: Products listed are representative of connectivity options available to Macintosh users. Similar offerings may be available from other vendors.

From previous page
with standard protocols for file service and multiuser applications.

AppleTalk is also media-independent, Sidhu says. Upper-layer protocol stacks can be implemented on top of a range of physical and link-layer implementations other than the AppleTalk Personal Network, including Ethernet or token-ring networks.

In addition, "several protocol stacks can talk to lower-layer implementations concurrently," Sidhu explains.

Among currently available cabling options are a Du Pont fiber-optic scheme that supports AppleTalk at 230.4K bit/sec, and Farallon Computing's PhoneNET, which lets users run AppleTalk over nonshielded twisted pair. DuPont is also working on higher speed fiber-based configurations for bridging smaller, lower speed networks.

Michael B. Bailey, pro-

arrangement was used.

As the cornerstone of the AppleShare file server software, AFP lets AppleTalk-linked Macintoshes share a

central hard disk and provides a variety of file and directory security options that Apple says go beyond those of third-party serv-

ers such as TOPS.

Centram's bid

One example of Apple's hesitancy in embracing

multivendor connectivity until recently was its mercurial relationship with Centram Systems West, Inc., now a Sun Microsystems, Inc. subsidiary. Centram's TOPS program allows transparent file sharing between Macintoshes, IBM Personal Computers and Unix-based computers.

As Centram President Nat Goldhaber tells it, Cen-

As the cornerstone of the AppleShare file server software, AFP lets AppleTalk-linked Macintoshes share a central hard disk.

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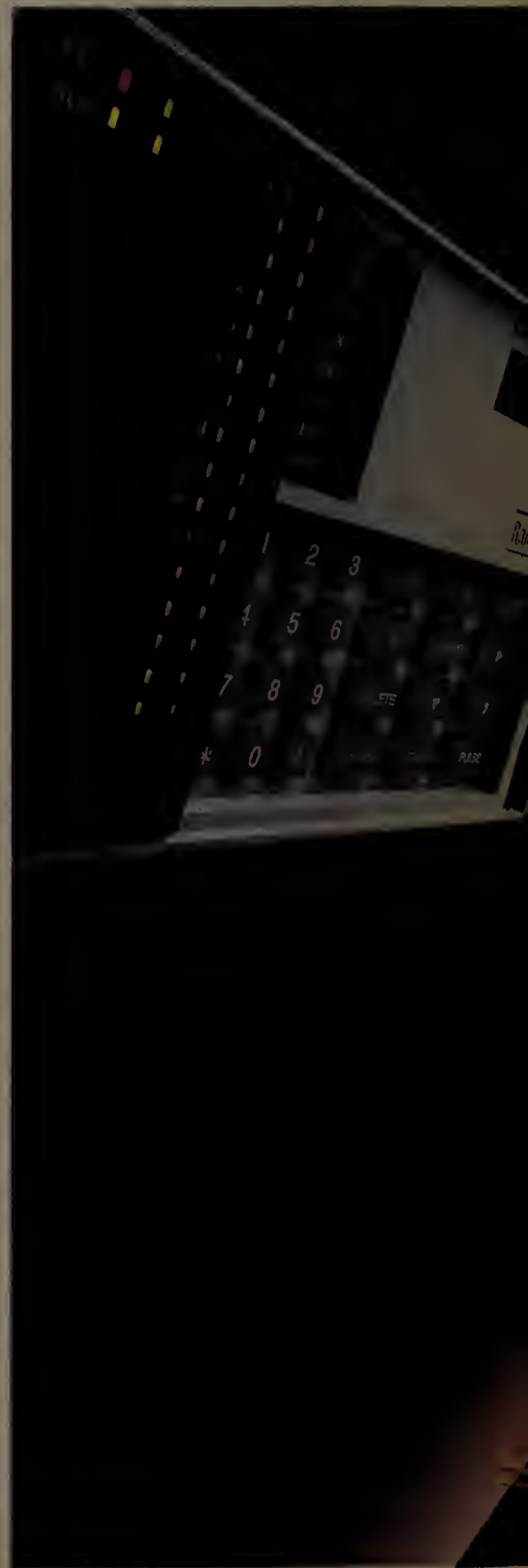
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"Unlike some networks, AppleTalk provides accessible interfaces at each layer," says Apple's Gursharan Sidhu.

gram plans specialist for Lockheed Missiles and Space, Inc., thinks Apple provides superior lower layer links. "If I had a group of IBM PCs, I would use PhoneNET cabling, [Transcendental Operating System] boards and software for the PCs and link them over AppleTalk. This would be cheaper and easier to use than the IBM Token-Ring or Novell's NetWare, the two we looked at." Currently, Bailey runs an AppleTalk network linking eight personal computers and 20 Macintoshes.

"Unlike some networks, AppleTalk provides accessible interfaces at each layer," Sidhu says. "This allows third parties to extend or augment services at any layer."

Before AFP, AppleTalk had no standard rules for file sharing; this was handled by each application or a less powerful disk server



tram and former Apple Chairman Steve Jobs were working toward an agreement that would have made TOPS a part of the Macintosh's read-only memory.

But after the departure of Jobs, Apple's engineering division "apparently didn't believe there was anyone out there other than Apple. They made decisions about how the Mac

internals worked that made it very, very difficult for anybody, including themselves, to perform multi-vendor connectivity. They

seemed to have decided that connectivity was a nice thing to talk about, but really what they were doing was selling Macs,"

Goldhaber says.

Centram went ahead without Apple and developed TOPS, which is now the most popular network-

ing software for the Macintosh. Hirshberg acknowledges that Apple had a developmental relationship with Centram but says that TOPS simply didn't fit Apple's communications strategy.

Goldhaber now acknowledges Apple's recent about-face on connectivity. "Changes are being made on fundamental levels, which are making it easier to hook Apple up to other parts of the world," he says.

Third-party relations

Given the crucial role third parties have played in filling gaps in Apple's communications line, it's not surprising that most third-party developers find Apple accommodating.

However, some vendors claim that Apple was secretive in introducing AFP.

Tangent's Mariande says Apple gave third-party developers a preliminary draft of the AFP specifica-

Some third-party developers claim that Apple was secretive in introducing AppleTalk Filing Protocol.

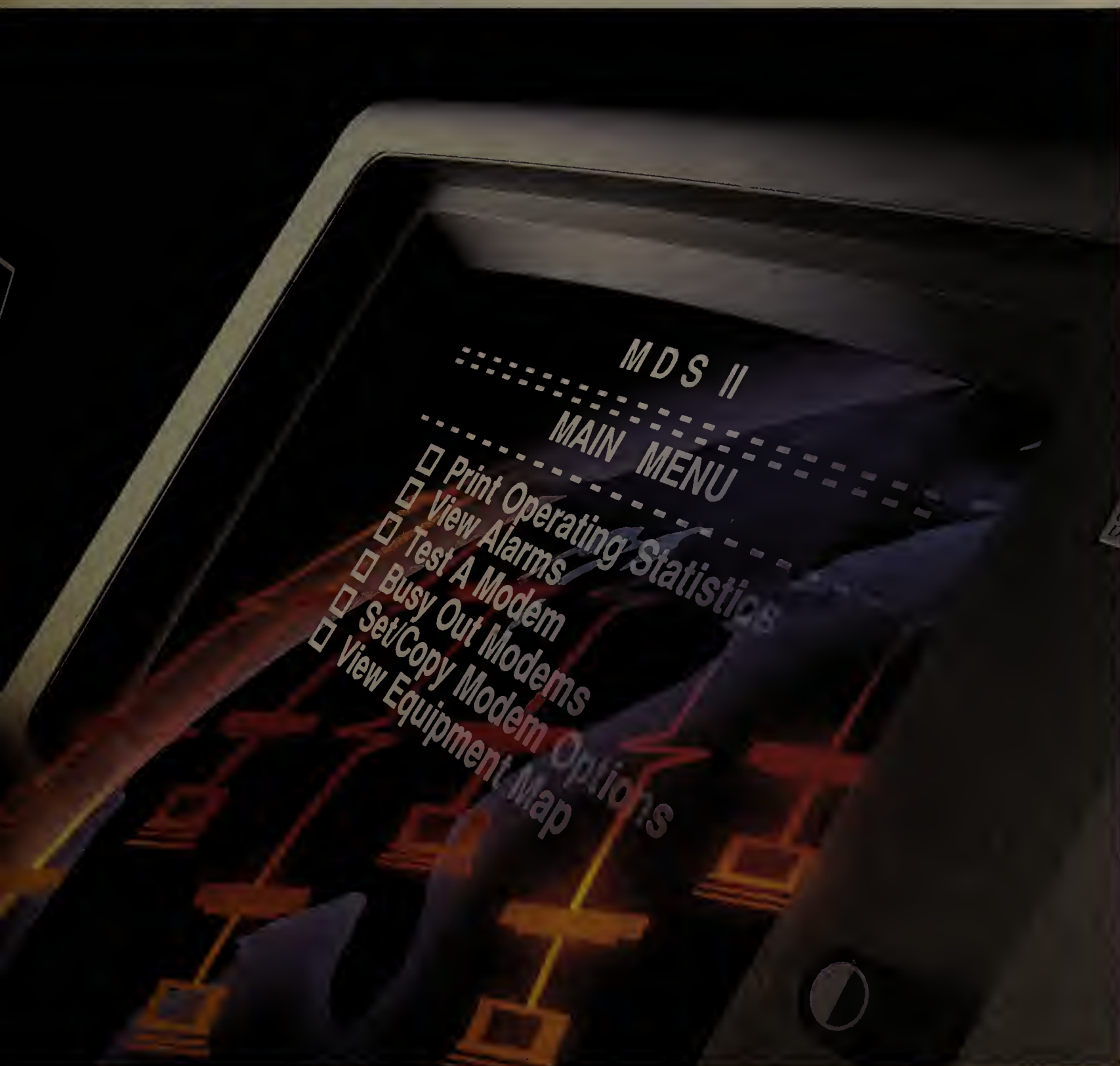
tion in November 1985, "but since they were working on a product of their own based on that specification, they never finalized it until they had shipped their product. So third parties who wanted to develop an alternative solution had to wait until Apple shipped AppleShare before they could get any technical help."

Apple disputes third-party vendor complaints about its introduction of AFP. It claims that the protocol was "seeded" to close to 100 developers long before it was shipped and says that approximately 25 "AppleShare-aware" products are currently available.

Apple isn't ignoring emerging standards such as LU 6.2, X.400 and X.25, according to Sidhu. "These are all vital parts of our strategy. We realize that

Continued on next page

Management For Modems. Has The Vision.



From previous page
the [Open Systems Interconnect] protocols are going to be the major game in town, in addition to IBM. We've invested 60% to 70% of our engineering resources on OSI and IBM," Sidhu says.

"Right now, we have a research center in France that's dedicated to developing OSI, we've invested in Touch Communications, [Inc.], which is providing OSI capabilities, and we're working on OSI activities in Cupertino, [Calif.] We're also one of the founding members of the Corporation for Open Systems," he adds.

In May, Apple purchased a minority interest in Touch Communications, maker of versions of OSI software for IBM Personal Computers and VAX-VMS computers. Touch's OSI products comply with the Manufacturing Automation Protocol/Technical and Office Protocol draft Version 3.0 specifications, according to Touch President and CEO William Fello. Under the agreement, Touch will work with Apple to develop OSI software that will take advantage of the Macintosh's icon- and menu-driven commands to access and transfer files from a Personal Computer or VAX over a TOP network.

Also, Apple will support TCP/IP via the AU/X operating system

According to Bob McNinsh of Apple, "from the Mac point of view, ISDN is a fast serial port, and that's important."

over the EtherTalk network. Under the Macintosh operating system, third-party products already provide TCP/IP support, including access to Telnet and File Transfer Protocol services.

Apple is also "pragmatically supporting ISDN," says Bob McNinsh, project manager for business development at Apple. "From the Mac point of view, ISDN is a fast serial port, and that's important." A representative of Hayes Microcomputer Products, Inc., which has recently unveiled a prototype Integrated Services Digital Networks terminal adapter for the IBM Personal Computer, declined to comment on whether the company plans to introduce a terminal adapter for the Macintosh.

Conclusion

Apple insists that the slow evolution of its connectivity products is part of a deliberate and careful migration strategy. According to Hirshberg, this has been necessary because of Apple's intention to provide "integrated solutions where everything fits together

seamlessly. We're trying to maintain a coherent user interface across all applications and environments."

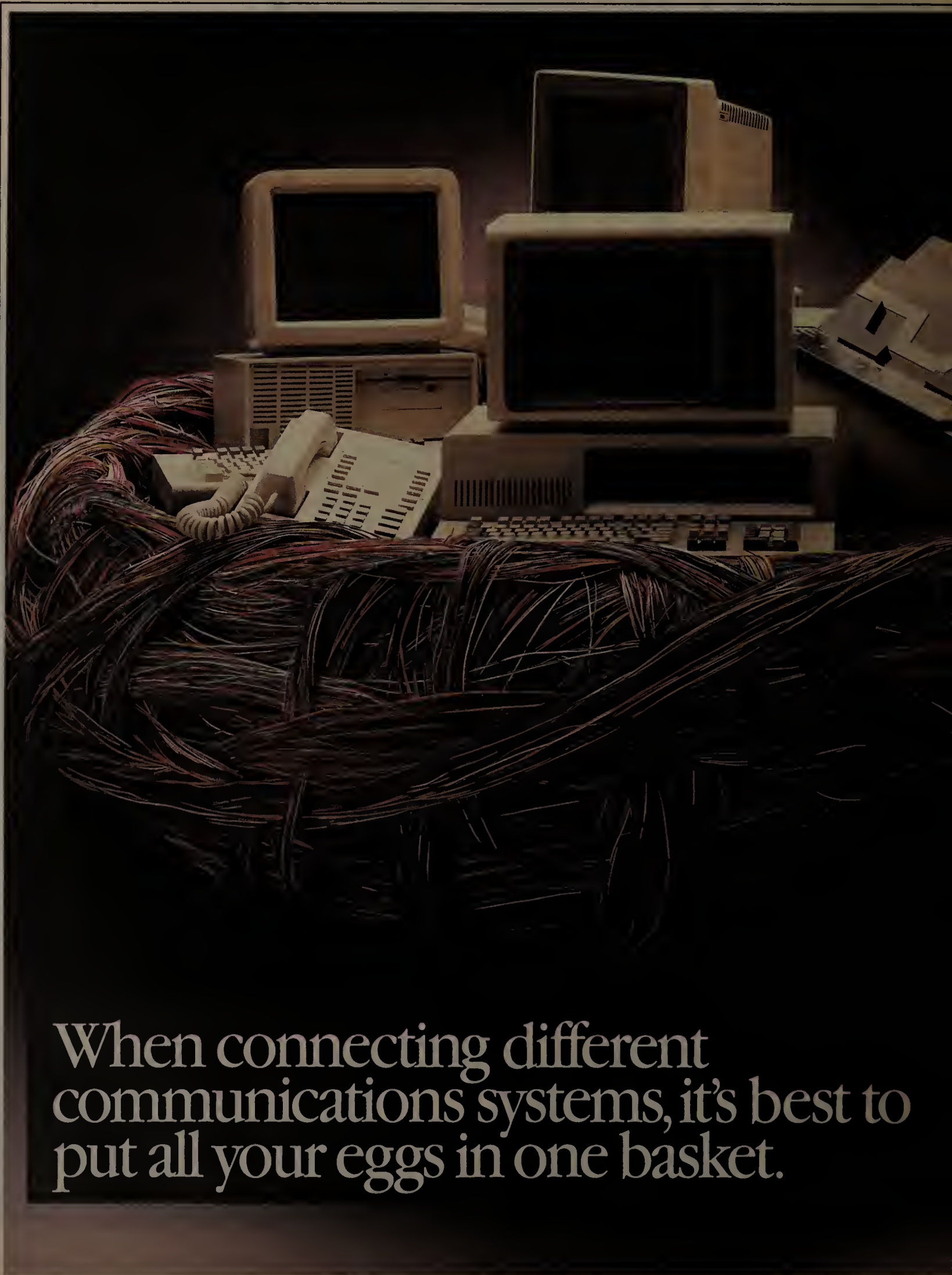
One Fortune 500 user who has come to appreciate this product

strategy is William Montieth, director of information resources management for Armco, Inc. of Middletown, Ohio. Although he formerly presided over an exclusively IBM Personal Computer

shop, Montieth is replacing the firm's Personal Computers with networked Macintoshes. "I'm amazed at the ease with which we've been able to install AppleTalk networks or find packages which easily provide links to other vendors," Montieth says. "Training people to use networked Macs is easier than with PCs. It has caused us to completely rethink how we approach the office."

Apple has taken its first steps out of the "Apple-centric" days of the closed Macintosh. But users who want to spread the benefits of Apple's superior user interface across multivendor networks will have to wait and see what arrives in the years following the year of "desktop communications." □

"I'm amazed at the ease with which we've been able to install AppleTalk networks or find packages which easily provide links to other vendors," says William Montieth of Middletown, Ohio-based Armco, Inc.



When connecting different communications systems, it's best to put all your eggs in one basket.

Oil giants bank on POS cards

continued from page 15

who pay in cash. Mobil+ will also enable customers to use the card to receive up to \$20 in cash from Mobil stations.

The real difference between ATM card and ACH debit transactions is in how the money moves from the customer to the companies. With ACH processing, Exxon and Mobil capture ACH debit transactions on-line at their data centers. At the end of the day, they upload a batch file to their joint ACH processor, the New York-based Chase Manhattan Bank, N.A. Chase sorts the files and sends electronic messages to customer fi-

nancial institutions requesting the electronic movement of funds to Exxon's or Mobil's financial institution.

"The biggest difference between on-line POS and ACH POS is that ACH POS does not have on-line authorization of every transaction. The retailer is essentially taking an electronic check, which is no more guaranteed than a paper check. It just moves through the system faster," Love said.

Mobil and Exxon first developed their POS networks to process credit card transactions electronically. The networks reduced the time it took to move funds from a customer's financial institution to that of the companies. They also trimmed losses due to stolen credit

cards by enabling station attendants to validate the card on-line. Both firms, along with Atlantic Richfield Co. (ARCO), soon found accepting bank ATM cards also widened the use of their POS nets.

"The three major gasoline retailers moving aggressively into debit cards are Mobil, Exxon and ARCO," Love said. Mobil was the first to accept an on-line debit card and currently has the most terminals. Exxon is quickly approaching Mobil in terms of terminal locations, Love said. But, ARCO's Pay-Point has the largest debit card volume, with nearly one million transactions a month in 500 California, Nevada and Arizona locations, he said.

Exxon will accept its new cards

at 3,000 of its 14,500 gas stations, and Mobil will accept its new cards at 3,800 of its 13,000 to 14,000 gas stations equipped with POS terminals. Exxon expects to increase the number of stations accepting its card to 3,700 by year end, while Mobil's plans call for its card to be accepted at 5,000 stations by 1988.

Just as with on-line debit card transactions, the new cards are passed through a card reader terminal at the gas station. The customer then enters a personal identification number (PIN) on an attached PIN pad. When the transaction is complete, the customer gets a printed receipt.

In Exxon's case, each time a credit card or debit card is used at the POS, the transaction is passed over leased lines to Exxon's data center in Houston. "If it's an Exxon Card transaction, we authorize it based on internal files showing the account is active. In the case of an ATM card, our computer will switch that transaction out to the card-owning network, which will authorize that sale," Phegley said.

Exxon began an ACH-based POS pilot program, dubbed AutoCheck, in Arizona in late 1983. The company has since expanded its on-line program through agreements with eight ATM networks throughout Texas, Florida, Arizona, the Southwest and the Mid-Atlantic.

Mobil, meanwhile, reached agreements to accept 20 different ATM cards nationwide since expanding its 1983 on-line debit card pilot conducted in Norfolk, Va.

While Exxon is not charging a membership fee for its card, Mobil will charge \$12 for Mobil+. Users purchasing \$400 of Mobil products a year with Mobil+ can renew for \$12. Otherwise, renewal costs \$25.

Exxon officials cited company policy for not divulging how much it cost to build their network or the number of current or estimated transactions sent over the network. Exxon also would not divulge specific network configurations or what equipment is used in the network.

However, Phegley said Exxon's terminals are linked via multidrop lines to regional multiplexer points that transmit to its Houston data center. The host determines from data collected from the card's magnetic strip whether the transaction stays within Exxon's system or is routed to another processor.

Mobil uses AFI Datatrol 3205 asynchronous terminals at gasoline stations. Those terminals communicate over 1,200 bit/sec multidrop circuits to 13 multiplexer sites, which feed traffic to a 10-processor Tandem Computer, Inc. Non-Stop TXP system in Kansas City, Mo. That data center also provides links to ATM network and credit card processors.

ACH debit transactions returned to Exxon due to insufficient funds will be charged automatically to the user's credit card along with a fee for processing the returned transaction. Mobil, however, will hold those returns in a different account that will enable customers to avoid the return fee by forwarding a check. ☐

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continued from page 4

to be called TickeTellers, will be based on HP personal computers, with attached printers for tickets, boarding passes and itineraries. The terminals will also have a credit card reader, a vault for blank tickets and a touch screen for approval commands similar to those of automated teller machines.

Like ATMs, which are used in bank networks, the machines will be designed to resist vandalism. Travel industry experts are skeptical the scheme will pull a profit for Teletix, arguing that most travelers are in the habit of obtaining all

airline tickets prior to beginning a trip.

"I'm not quite sure where Teletix expects to get its revenue," said Thornton Clark, senior vice-president at Heritage Travel, Inc., a large corporate travel agency. "You sell very few tickets to people staying in hotels."

The pact with minicomputer maker HP provides for the assembly of 2,500 TickeTellers in the first year with a value of \$20 million and a total of 10,500 machines at the end of three years.

HP will also service the machines with its existing support forces. The company has not previously been involved in public network or ATM-type services, a spokeswoman said. □

Network advances

continued from page 5

tion during transmission, thereby also eliminating the need for repeaters.

Merwyn Brodsky, director of material sciences at Argonne National Laboratory, said superconductivity technology will likely first be applied to the transmission of electrical power.

"Roughly 10% of the energy generated in this country is lost in transmission. That is simply too much," Brodsky said. "If we are able to build superconducting transmission lines and correct that problem, that could carry over into communications transmission."

A more computer-specific application of superconductors would be in the development of very large scale integrated circuitry, according to a Bell Communications Research spokesman. Superconduc-

tive connections between components would generate no heat, allowing devices to be brought closer together and opening the door to a new generation of ultra-fast computers.

But Bell Laboratories' Chin said news about superconductivity has turned attention away from other technologies, particularly fiber optics, that are approaching levels of efficiency that will be hard to beat.

"Optical fibers would be hard to beat economically," Chin said. "But if you can get superconductivity at room temperature, all of the equations would change."

John Rowell, new materials expert at BELLCORE, said researchers are only beginning to discover the potential applications of superconductivity. Speaking at the Federal Conference on the Commercial Applications of Superconductivity in July, Rowell said scientists must think in "new and inventive ways." □

GEISCO will sell ASC ware

continued from page 6

ments to both its raw materials providers and its retail store chains. To accomplish this, all parties must have the ACS translation software on either a System/36 or System/38.

EDI is defined as the computer-to-computer exchange of standard-formatted business forms. EDI automates communications between manufacturers and their business partners by standardizing networking methods to exchange these transactions. The automotive, pharmaceutical, supermarket and banking industries are among those looking to eliminate paper transactions by using EDI.

Several value-added network operators, including GEISCO, IBM and Telenet Communications Corp., are positioning themselves as EDI network service providers. IBM recently invited current and prospective users of its Information Network to East Rutherford, N.J., to discuss use of this value-added network as an EDI document delivery system. Telenet and Sterling Software's OrderNet services division, an EDI network provider, signed an agreement in July under which Telenet will resell OrderNet's EDI service nationwide.

Mike Nelson, director of EDI services marketing for ACS, said the company's new translation software is not targeted only at the apparel industry. "The software can be used by trading partners in a specific industry or across multiple industries," he said.

Although GEISCO's EDI*Express service currently performs some document translation, Nelson claimed this process, which he said

must be done on-line, is both time-consuming and expensive. Used in conjunction with the EDI*Express service, the ACS software would enable users to perform necessary document translation off-line and, therefore, reduce communications costs, he explained.

Robert Green, distribution marketing manager for GEISCO, said use of the ACS software with EDI*Express would slash the amount of time a user would spend developing software for, and a communications interface to, an EDI system. ACS software consists of a communications emulator for the System/36 or System/38 and an EDI services module that handles the administrative work involved with connecting the IBM computers to EDI*Express.

"The actual software takes a transaction in X.12 format and translates it into a flat file that is much easier for an EDI user's order or invoice processing system to handle," Green explained. "The software will save users a lot of programming time."

Green said ACS had developed a familiarity with the System/36 and System/38 that GEISCO had not. "ACS has written major applications software programs for the two systems," he said. "They have a close relationship with IBM that we just didn't have."

EDI industry trackers concur that GEISCO has been more aggressively addressing the EDI needs of individual industries than its competitors. In late June, GEISCO signed a marketing arrangement with Baxter Travenol Laboratories, Inc. that enables the large manufacturer of medical and surgical supplies to act as sales agent for EDI*Express for the hospital industry. □

Dow Jones upgrades satellite net

continued from page 1

need to replace the network at an estimated cost of \$8 million.

Dow Jones, publisher of *The Wall Street Journal* and other publications, uses the satellite network to beam facsimiles of newspaper pages from three regional composition sites to earth stations at 17 printing plants around the country, as well as to carry the company's voice and data traffic.

The original network employed time-division multiple access (TDMA), an access technique that allows earth stations to share the same frequency bandwidth. Under TDMA, each transmission burst is precisely timed to arrive in sequence, so that only one earth station is accessing the transponder at any given time.

Until the beginning of August, all 17 stations on the 7-year-old network operated at one frequency and shared the same 11 MHz of bandwidth.

The Dow Jones's model CT-2000-001 TDMA terminals, supplied by Comtel, a subsidiary of Spar Communications Group, provide each earth station with up to 15M bit/sec of throughput. But since under the TDMA system each

station had to wait its turn to transmit, the 15M bit/sec maximum was never realized by the individual stations.

The new access capability combines TDMA with frequency-division multiple access (FDMA), creating what Comtel calls frequency hopping. The FDMA equipment currently being added to the earth stations will let them transmit on each of several frequencies.

The potential transmission time for each earth station will be increased in exact proportion to the number of frequencies available. Six of the 17 stations will transmit on four frequencies, giving them four times as many time slots on which to transmit, while the other 11 will each support two frequencies and enjoy twice as much transmission time.

Bill Collins, manager of satellite operations at Dow Jones, said the ability to allocate time slots on four frequencies will be a low-cost boon to network capacity. "What the frequency hopping allows us to do is, depending on how many hops we make, use up to four virtual TDMA's without increasing the [TDMA] hardware," he said.

The frequency-hopping capability will push the maximum throughput of the two-way communications network from 15M bit/sec to 60M bit/sec and cost about \$40,000 per earth station.

If Dow Jones had not been able to develop and implement the frequency-hopping capability, it would have had to scrap the 15M bit/sec TDMA equipment installed at all 17 stations and replace them with Comtel's 60M bit/sec model CT-2000-002s. That would have cost roughly \$200,000 per earth station, a price that does not include the electronic gear that performs frequency conversion and amplification.

The total cost of an all-TDMA network providing 60M bit/sec of

throughput would have been between \$400,000 and \$500,000 per earth station, or roughly \$8 million, said David Block, manager of engineering services at Comtel.

Dow Jones may be the first commercial user to combine frequency- and time-division access on the same net, Block said. Santa Maria, Calif.-based Comtel supplied the original Dow Jones network and helped the company develop the software for the frequency hopping now being implemented.

According to Collins, the additional capacity is needed to handle high transmission demands currently straining the net's capabilities. "Up until we converted to this hop stuff, we were maxed out on our TDMA system," he said. □

US Sprint files suit

continued from page 4

now instituted an all-out effort to track down offenders and recoup its losses. Furtney said US Sprint's software and monitoring systems identify codes over which an unusually large number of calls have been made or those whose monthly payments have shown dramatic changes. In many cases, Furtney

said, the systems can then track down the origination of the calls.

"It's relatively easy to prove code abuse," Furtney said, "but the question is always: Do the offenders have the assets to pay us back?" Thus far, he added, most code abusers have opted to pay to avoid court or prison.

"People have to realize that this isn't a cute crime," Furtney said. "All the phone users in the country pay for code abuse." □

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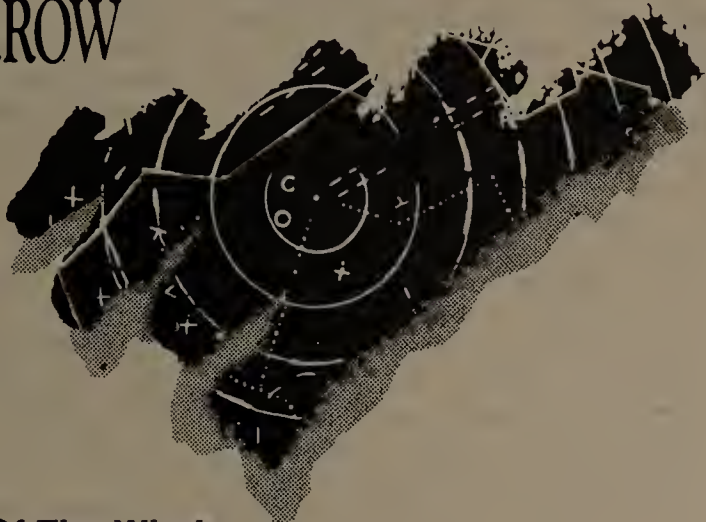
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Intra-LATA toll war brews

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haul carrier. The profits are particularly rich in states such as Connecticut, Massachusetts, New York, California and Florida, which contain several heavily trafficked intra-LATA corridors between cities.

According to Jim McGann, an AT&T spokesman, AT&T and the other facilities-based carriers — such as MCI, US Sprint Communications Co. and ITT Corp. — are permitted to compete for intra-LATA traffic in 13 states, and another four states are about to authorize intra-LATA competition.

While the trend is toward deregulation, the process has been slow and fraught with complications. Part of the problem is that intra-LATA service is regulated by the state public utilities commissions, making the process of authorization an arduous and fragmented one for the long-distance carriers.

Although the carriers are fighting for the right to offer intra-LATA services, none as yet has aggressively targeted that market. "We're behind the eight ball before we start," McGann commented. "The BOCs have a distinct cost advantage with their highly efficient intra-LATA toll networks." The carrier networks, McGann explained, are optimized for long-haul traffic and therefore have fewer points of presence within BOC LATAs.

More significantly, intra-LATA equal access does not exist. Customers who wish to use their long-distance carrier to call within a LATA must dial a four-digit carrier identification code — the so-called 10XX code — before dialing each telephone number. One-plus dialing within the LATA directs calls automatically over the BOC, which

therefore has a competitive advantage because such dialing is far preferable to the user.

Additionally, the long-haul carriers are at an economic disadvantage because of the access charges they pay the BOCs. According to Bob Self, president of Market Dynamics, Inc., a consulting firm in New York, "Sometimes the access charge the BOC charges the long-distance carriers exceeds the cost of making the entire call on the BOC facilities, so how in the world can the long-distance carrier price its service competitively?"

However, analysts said, there is evidence that the climate is changing and that true competition with-

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in LATAs is likely to develop.

Self said there is a "move under way on the part of the state regulators to require the BOCs to charge themselves the same access charges levied on the long-haul companies."

Ron Choura, supervisor for regulatory affairs with the Michigan Public Services Commission, said several states have already forced their BOCs to levy access charges on themselves and that many more have the issue under consideration.

Allnet's Fain added, "The BOCs will have trouble arguing that what they provide to themselves is

different from what they provide to the long-haul carriers."

But even if the playing field is leveled with regard to access charges, the long-haul carriers still have to compete with the BOCs' highly efficient intra-LATA operations.

Page Montgomery, vice-president with Economics and Technology, Inc., a Boston-based consulting firm, said New England Telephone has provided a report to regulatory bodies stating that, if it had to, the BOC could charge as little as 2 cents per minute for an intra-LATA call and still make money. "AT&T responded to that in its own study, saying there's no way we can beat them at this," according to Montgomery.

Nonetheless, the ball is still rolling on the regulatory side. A number of states have taken the issue of intra-LATA equal access under consideration. Jeff Close, a consultant with DMW Group, Inc. in Ann Arbor, Mich., says intra-LATA equal access probably never will become a reality. "It would require significant memory upgrades on central office switches — who's going to pay for that?"

In the end, some suggest the BOCs may be willing to foot the bill if intra-LATA equal access would gain them freedom in other markets.

"If the BOCs cling to their local monopolies, they won't be allowed into the long-distance business," noted Bob Ellis, president of The Aries Group, Inc. in Rockville, Md. "In order to enter long distance, the BOCs will have to prove they have done everything in their power to foster intra-LATA competition. It's a tough one to call, because they want to protect their territory, but in the long term, their best interest would involve their entry into long distance." □

CALENDAR

- Sept. 1-3, Dallas — Intermediate Data Communications.** Contact: The International Communications Association, Suite 710, 12750 Merit Drive, Dallas, Texas 75251.
- Sept. 11, Minneapolis — The Future of Telecommunications Competition and Regulation: What's in the Public Interest?** Contact: Patty Manske, The Humphrey Institute, Suite 235, 301 19th Ave. S., Minneapolis, Minn. 55455.
- Sept. 15-17, Chicago — Fundamentals of Telecommunications.** Also, Oct. 26-28, Phoenix, Ariz.; Dec. 1-3, Chicago. Contact: ABC TeleTraining, P.O. Box 537, Geneva, Ill. 60134.
- Sept. 16-18, San Francisco — SNA Architecture and Implementation.** Also, Oct. 7-9, Boston. Contact: Communications Solutions, Inc., 2125 Hamilton Ave., San Jose, Calif. 95125.
- Sept. 21-22, Parsippany, N.J. — Networking IBM and Compatible Personal Computers.** Also, Sept. 28-29, Philadelphia; Oct. 5-6, New York; Oct. 7-8, Boston. Contact: Quest, 124 Madie Ave., Spotswood, N.J. 08884.

- Sept. 21-23, McLean, Va. — Bell Operating Company Data Services Strategies Conference.** Contact: Sharon Feinstein, TeleStrategies, Inc., Suite 100, 1355 Beverly Road, McLean, Va. 22101.
- Sept. 23-25, Chicago — Hands-On T-1.** Also, Oct. 7-9, Boston; Oct. 14-16, Detroit; Oct. 28-30, Washington, D.C. Contact: American Institute, 55 Main St., Madison, N.J. 07940.

- Sept. 24-25, San Diego — Network Management Systems Expo '87.** Contact: TeleStrategies, 1355 Beverly Road, McLean, Va. 22101.
- Oct. 5-6, Raleigh, N.C. — Networking IBM Personal Computers and Personal System/2.** Also, Oct. 7-8, Detroit; Oct. 19-20, Hartford, Conn.; Oct. 21-22, Pittsburgh. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

- Oct. 12-15, Washington, D.C. — Telephone Technology and Practice.** Contact: ABC TeleTraining, P.O. Box 537, Geneva, Ill. 60134.
- Oct. 26-28, New York — The VAX Business User Forum.** Contact: Dorothy Ferriter, IDG Conference Management Group, P.O. Box 9171, Framingham, Mass. 01701.

- Oct. 27-28, Stamford, Conn. — 1988 MAPTEK USA Communications Opportunities Strategy Conference.** Contact: Quantum Consultants, Inc., 1114 Avenue of the Americas, New York 10036.

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HP launches 10M bit/sec Ethernet

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square wave on the cable, HP created a special wave-shaping mechanism so that, over distance, the wave shape doesn't radiate as much and is, therefore, less susceptible to interference. HP also designed a special filter to differentiate the special wave from electrical noise on the wire.

"We believe the market really wants to use existing wiring, if at all possible," Guidon said. To help make that a reality, HP will also offer a testing service to determine if a customer's site wiring is us-

able. The charge for the testing service is \$115 per hour. At one beta installation, the cost of testing 10 lines was \$195. If all or some of a customer's wiring requirements cannot be met by existing wire, HP will subcontract with an installation contractor to install new wire.

The cost of a StarLAN 10 user kit, which includes networking hardware and software for the workstation, will be less than \$1,000, HP said. The network, which will be sold through HP's direct sales force, will be available in the first half of 1988. It will also likely allow other firms that are not direct competitors to become OEMs for the product. □

Finance skills a manager must

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of depreciation," Luyties said. "You don't have to know all of them, but you have to be aware of them to discuss them with an expert. You've got to know enough to ask the right questions."

If a communications manager is considering purchasing a T-1 multiplexer, using T-1 links to connect a West Coast facility to the company's New York headquarters and replacing voice-grade leased lines, an understanding of basic finance principles will help in evaluating the cost of the change, Luyties said.

The multiplexer, of course, would be depreciated over a specific period of time. The decision would also take into consideration the discounted cash-flow method, which simply recognizes that today's dollar is worth more than tomorrow's dollar.

For example, the manager may try to compare the up-front cost of the multiplexer with the estimated cost of leased lines that could be eliminated as a result of its purchase. But the cost of leased lines for five years, for example, cannot be compared to the cost of a multiplexer purchased with today's dollars. "The up-front money you spend today for a multiplexer cannot be compared to a five-year stream of payments," Luyties said.

It is important to use the discount rate that the corporation uses in figuring its discounted cash-flow method. "The manager can go to the corporate finance people and say, 'I'm trying to compare a capital purchase with some monthly usage costs it can replace,'" Luyties said. "They will know the formula."

There are a growing number of financial options facing communications managers, Luyties said. Many users, for example, are turning to private networks and purchasing equipment to take advantage of bulk bandwidth services, but long-haul carriers also offer virtual network services that are paid for on a monthly basis and require no capital outlay. "You've got to have some idea of the financial considerations involved in these decisions, so that you can have your financial department advise you," Luyties said.

The communications manager and the finance people must work together in evaluating equipment and service decisions, said James Gordon, president of TCS Communications Consultants in Nashville.

"The telecommunications manager is the person who knows what part of a system's costs are fixed and what parts will go up." Furthermore, he said, the telecommunications manager can ensure that the company is making an "apples-to-apples" decision in evaluating vendors' products.

Ian Angus, president of Angus TeleManagement Group, Inc., a Toronto-based consulting company, agreed, saying vendors will package and price their products differently. One vendor may not include software or maintenance as part of a PBX offering. "The communications manager knows if a bid includes all of the specified options," he said.

And, Angus pointed out, while a company's financial experts can determine what depreciation schedule to use for purposes of the Internal Revenue Service, it is the communications manager who must evaluate the effective life of a piece of equipment from an operational point of view for a depreciation schedule that will be used for the company's books.

A knowledge of finance is especially important for the manager who wishes to become involved in an organization's strategic planning, Luyties said. It will help make clear the benefits of technology in furthering the company's business plans.

"If you are going to sell your management on spending money up front that will result in a big payback, you better be able to explain the financial considerations," he said.

"In order to get resources and funding, you have to understand management's world view," said TCS Communications' Gordon. "You cannot communicate with or aspire to join upper management if you don't know their language, which is essentially the language of finance." If you are a communications manager making major network decisions, looking for ways to use communications for strategic advantage and trying to speak the language of upper management, then you had better learn the workings of finance. □

► MINICOMPUTER-TO-HOST

Tandem high-speed mainframe link bows

BY MARY PETROSKY

West Coast Correspondent

CUPERTINO, Calif. — Tandem Computers, Inc. today introduced a channel attachment unit, dubbed Snaxlink, that links Tandem minicomputers directly to IBM and IBM-compatible mainframe channels at speeds of up to 1M bit/sec.

Attaching directly to IBM host channels — typically used to support disk drives and peripherals that require high-speed links, like page printers — Snaxlink bypasses IBMs 3725 or 3705 front-end processors, the way Tandem usually interfaces to IBM mainframes.

Snaxlink consists of a communications interface that attaches to a Tandem system's I/O channel, a channel attachment unit that connects to an IBM system's channel and a fiber-optic link between the units. The Tandem and IBM sys-

tems can be up to 500 meters, or 1,640 ft., apart.

Snax, Tandem software that communicates with IBM's Virtual Telecommunications Access Method, has been upgraded to support Snaxlink; applications that currently use Snax do not have to be modified to use Snaxlink, according to Steven E. Saltwick, product marketing manager.

Snaxlink allows for full-duplex communications and can handle up to 1,020 sessions concurrently. The fiber-based link can be attached to both block and byte multiplexed IBM host channels.

Snaxlink is priced at \$49,550 for a single unit and \$79,676 for two units. Basic monthly maintenance charge is \$88 for one unit and \$176 for two units. The monthly license fee for software is \$125 per unit. Snaxlink will be available in the fourth quarter of 1987. □

ICA reports on key trends

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The "1987 Telecommunications Professional Survey" reports what the ICA labeled "a strong shift in the telecommunications department's reporting relationship within the organization." In 1984, according to the study, 50% of telecommunications "functions" reported to data processing or management information systems. In 1986, that figure increased to 69%. "Responsibility for telecommunications," the study said, "is moving away from the administrative, corporate staff and finance arenas."

The study, prepared for ICA's Member Services Committee, provided information on 642 telecommunications professionals at 124 ICA member companies.

The report stated that, in 1986, base salary for telecommunications professionals in all categories increased an average 8.7%. "This increase continues a trend of telecommunications... salary increases exceeding those granted within general industry, where the average 1986 base salary increase was from 4% to 5%," the study said.

According to the spending report, air carriers expected to spend, on average, 26.15% more on telecommunications in 1987 than they did in 1986. The budget expansion highlights the growing importance of communications technology to users in the increasingly competitive deregulated airline industry.

The trucking industry, which has also undergone deregulation, ranked second in increased telecommunications expenditures. Users in that industry segment expect to spend nearly 15% more on telecommunications equipment,

services and personnel this year than they did last year. Government agencies expect a more than 12% increase in such expenditures, and users in the financial industry expect to spend nearly 11% more.

Users in four of the 28 industry groups — publishing/broadcasting, natural resources, steel and utilities — said they will likely spend less on telecommunications in 1987 than they did in 1986.

For the spending survey, the Member Services Committee surveyed 620 ICA member companies, each of which spends in excess of \$1 million annually on telecommunications, and received responses from nearly 150 members. In addition to tracking trends in spending, the report also looked at telecommunications expenditures compared to total corporate revenues and operating expenses.

Users in the office equipment/computer industry segment devoted a greater percentage of overall revenues to telecommunications in 1986, an average of 1.7% of revenues, than their counterparts in other arenas. Air carriers were a close second, spending an average of 1.6% of total revenues on telecommunications. Users in the railroad, transportation/trucking and government segments spent an average of about 1.25% of revenues.

Respondents reported more than \$512.3 billion of total revenue and spent nearly \$3.2 billion on telecommunications.

Users grouped under the heading "conglomerates" devoted more than 5% of total corporate operating expenses to telecommunications in 1986. Office equipment/computer companies spent nearly 2.5% of total operating expenses on telecommunications. Telecommunications accounted for more than 2% of total operating expenses for users in the airline and banking industries. □

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